

The Iron Age

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The Statue of Liberty Pedestal.

The material underlying the foundation of the Bartholdi Statue of Liberty is compact clay, gravel and boulders. The foundation up to the terrace level—where the pedestal proper begins—is of solid concrete; it is 90 feet square at the bottom, 65 feet square at the top, and 52 feet 10 inches high. In the center of the mass is a well hole 10 feet square. Leading from the sides to the base of the central shaft or well hole are four arched passageways at the level of the parade. Spanning the space between the inside walls of the old fort and the foundation of the pedestal, and carrying the four flights of steps leading to the terrace and also the grassy mound between, is a concrete arch about $3\frac{1}{2}$ feet thick and having a chord span of 49 feet. The pedestal will be built of granite, backed with concrete. The principal dimensions are:

From high water to top of sea wall. 10 feet.
Top sea wall to foot of fort wall. $3\frac{1}{2}$ feet.
Foot fort wall to ground level at parapet of fort. $2\frac{1}{4}$ feet.
Parapet to foot of pedestal. 34 feet.
Water level to foot of pedestal. 60 feet 10 inches.
Foot of pedestal to top of pedestal. 89 feet.
Water level to top of pedestal. 149 feet 10 inches.
Base of pedestal. 69 feet square.

The top of the pedestal is 43½ feet square, and has the corners cut off, making it octagonal. The balcony at the top is 3 feet 7 inches wide in the clear, and extends all around. The loggia is 26 feet 7 inches high, the opening being 27 feet 11 inches wide by 3 feet deep in the clear. The columns are $3\frac{1}{4}$ feet wide, the space between them being 6 feet. On each side of the base of the pedestal will be 10 circular shields carrying coats-of-arms of the several States. The terrace will have a clear width of 15½ feet, while the stairways leading to it will be 10 feet wide. The method of holding the statue to the pedestal is as follows: Extending across the top of the pedestal are six channel-bars arranged in two sets of three each; these bars are directly beneath the corner posts of the main frame in the interior of the statue. Beneath and at right angles to these are six other channel-bars, also arranged in two sets, placed under the corner posts. These bars are 34 feet long, so that each end rests in the masonry to the depth of 3½ feet, the well hole or shaft being 26½ feet square. The channel-bars are 4 feet deep, the web plates are $\frac{3}{4}$ inch thick, and the angles are 4 by 5 inches by $\frac{3}{4}$ inch. The base of each post and the two sets of bars immediately beneath it are united by three bolts $5\frac{1}{2}$ inches in diameter.

A little over 60 feet below is a second and similarly arranged system of girders, 41 feet long, 36 inches deep, with web plate $\frac{3}{4}$ inch thick; the angles are 4 by 5 inches by $\frac{3}{4}$ inch. In the lower system there are only two channel bars in a set. These two systems are joined by four sets of eye-bars, placed as near as possible to the side walls of the shaft. Each set consists of four bars, 4 inches wide by 1½ inches thick. Upon the sides of the statue the upper ends of these bars will be prolonged to join the main frame at the tops of the first and second panels. All bracing within the pedestal will be made of steel. This method of anchoring the statue, says the *Scientific American*, is open to severe criticism. It practically hinges the statue at its base, the first section of the main frame serving as a fulcrum resisting the lateral pressure coming upon any side of the figure. This is the weakest part of the main frame, since it receives no support from the side extensions, which do not reach to the bottom of the lowest panel.

The pedestal was designed by Mr. Richard M. Hunt, the architect; the plan of anchoring the statue was designed by Gen. Charles P. Stone, chief engineer, under whose direction the work is now being carried forward.

A tool for making holes in tube sheets of boilers and in other plate-metal structures has been patented by W. F. Harrison, of Wilmington, Del. The tool is so made as to be readily adjustable for the cutting of holes of different diameters. It comprises two independently-adjustable and laterally-sliding tool-holders, extending through the cutter-head, and provided with cylindrical sockets for the reception of the cutters. A clamping-bar and nut are arranged to simultaneously clamp both the sliding tool-holders. Centrally through the head projects a cylindrical centering pin or bit provided with cutting teeth at its lower end. The cutters are adjusted radially to the center pin to the required distance by means of the slides, and are then clamped in place. A small hole is punched at the center of the opening to be made, and the cutter being placed in a drill press, the central pin will bore a small cylindrical guide opening, while the cutters will cut a channel through the metal concentric with the guide.

The Russell & Erwin Mfg. Co., of New Britain, Conn., are the patentees of a new wire nail. The shank of this nail is not made smooth, but is made in several tapering or conical sections. That is to say, from the point upward the nail widens for a short distance, is then contracted, and again widens. In this way a series of barbs are formed, which act as ratchet teeth and prevent withdrawal of the nail except by great force. The wire from which the nails are made is prepared with the projections in a continuous strip, and is then cut, headed and pointed.

Feeding Boilers at the Bottom.

One of the most important things to be considered in boiler construction, says the *Locomotive*, is the position and arrangement of the feed apparatus, but it is, unfortunately, one of the elements that is most often overlooked, or, if considered at all, only in a very superficial manner. Many seem to think that it is only necessary to have a hole somewhere in the boiler—no matter what part—through which water may be

now more particularly of the plain cylinder boiler, of which there are many in use throughout the country.

Plain cylinder boilers are, as a rule, provided with mud-drums, located near the back end. As a rule, also, these boilers are set in pairs over a single furnace, and the mud-drum extends across beneath and is connected to both, and one end projects through the setting wall at the side. It is a favorite method to connect the feed-pipe to the end of the mud-drum, which projects

produce a large volume of cold water through an opening in the bottom, and what becomes of it? Does it rise at once and become mixed with the large body of water in the boiler? By no means. It cannot rise until it has become heated, for there is a great difference between the specific gravity of water at 60°, or even 212° F., and water at 324°. Consequently it "hugs" the bottom of the boiler and flows toward the front end or hottest portion of the shell. Now let us examine the effect which it produces.

duced through an opening in the bottom, and flows along over these heated plates. If it could produce its full effect at once the contraction caused thereby would bring a stress of $300 \div 15 = 20$ tons per square inch upon the bottom plates of the shell. But fortunately it cannot exert its full effect at once, but it can act to such an extent that we have known it to rupture the plates of a new boiler through the seams on the bottom no less than three times in less than six weeks after the boilers were started up.

The effect in such cases will always be the most marked, especially if the plant is furnished with a heater, when the engine is not running, for then, as no steam is being drawn from the boilers, there is comparatively little circulation going on in the water in the boiler, and the water pumped in, colder than usual from the fact that the heater is not in operation, spreads out in a thin layer on the lowest point of the shell, and stays there, and keeps the temperature of the shell down, owing to the fires being banked or the draft shut, while the larger body of water above, at a temperature of from 300° to 325°, keeps the upper portion of the shell at its higher temperature. It will readily be seen that the strain brought upon the seams along the bottom is something enormous, and we can understand why it is many boilers of this class rupture their girth seams while being filled up for the night after the engine has been shut down. To most persons who have but a slight knowledge of the matter, we fancy it would be a surprise to see the persistence with which cold water will "hug" the bottom of a boiler under such circumstances. We have seen boilers when the fire has been drawn, and cold water pumped in to cool them off, so cold on the bottom that they felt cold to the touch, and must consequently have had a temperature considerably below 100° F., while the water on top, above the tubes, was sufficiently hot to scald; and they will remain in such a condition for hours.

The only thing to be done where feed connections are made in the manner described is to change them, and by changing them at once much trouble, or even a disastrous explosion, may be avoided. Put the feed-pipe in through the front head a few inches below the water line, drill and tap a hole the proper size for the feed-pipe, cut a long thread on the end of the pipe and screw the pipe through the head, letting it project through on the inside far enough to put on a coupling, then screw into the coupling a piece of pipe not less than 8 or 10 feet long, letting it run horizontally toward the back end of the boiler, the whole arrangement being only from 3 to 4 inches below the water line of the boiler, and hot or cold water may be fed indifferently without fear of danger from ruptured plates or leaky seams. In short, put in a "top feed" and avoid further trouble.

Blooming Mill at the Ebbw Vale Steel Works.

The Ebbw Vale Works have recently completed a blooming mill with balanced top roll, to handle 14½-inch rail ingots, making 6-inch blooms. Mr. Holland has given a description of the mill at a meeting of the British Institution of Mechanical Engineers, and *Engineering* has published a series of engravings, which we reproduce.

The rolls themselves are 36 inch centers, and are shown in elevation in Fig. 1, Fig. 2 being a plan. The blooms are conveyed from the rolls to the shears on live rollers, 24-inch centers and 19 inches in diameter by 13 inches wide. These are driven by a pair of 6½-inch by 10-inch vertical engines, geared 2 to 1. The shears, which are horizontal, are driven by a vertical engine, made at Ebbw Vale, 12 by 15 inches, geared 9½ to 1, the stroke of knife being 10 inches. The arrangement is shown in Fig. 8. Returning to the rolls, we find a new arrangement for turning and carrying the ingot from groove to groove, illustrated in Figs. 5 and 6. The arrangement of rollers on each side of the rolls is also shown in these illustrations. These rollers are placed 26¼-inch centers, are 16 inches in diameter, and are driven by a pair of vertical engines, 10-inch cylinders by 14-inch stroke.

The turning and carrying of the ingot is effected by two hydraulic cylinders. The turning or tipping cylinder is 6 inches in diameter by 16 inches stroke. This is shown to the right of the illustrations in Figs. 3 and 5. The piston-rod is connected to a square shaft by a connecting-rod and a crank lever. On the square shaft, which is placed parallel with the rollers, is a loose miter-wheel carried in a bearing on a movable carriage. This wheel gears into a miter-wheel on a shaft carried on a movable carriage at right angles to the carrying rollers. On this shaft are keyed four levers, and three are connected by links to tipping levers which work between the carrying rollers. The carriage on which the levers and their shaft are carried travels beneath the rolls, so as to take the ingot as it passes through each groove. The carriage is traversed by a hydraulic piston 8 inches in diameter by 6 feet 2 inches stroke.

For balancing the top roll two hydraulic rams 10½ inches in diameter are placed underneath the bed-plate of the roll standard, as shown in Figs. 1, 4 and 7. These are

(Continued on page 17.)

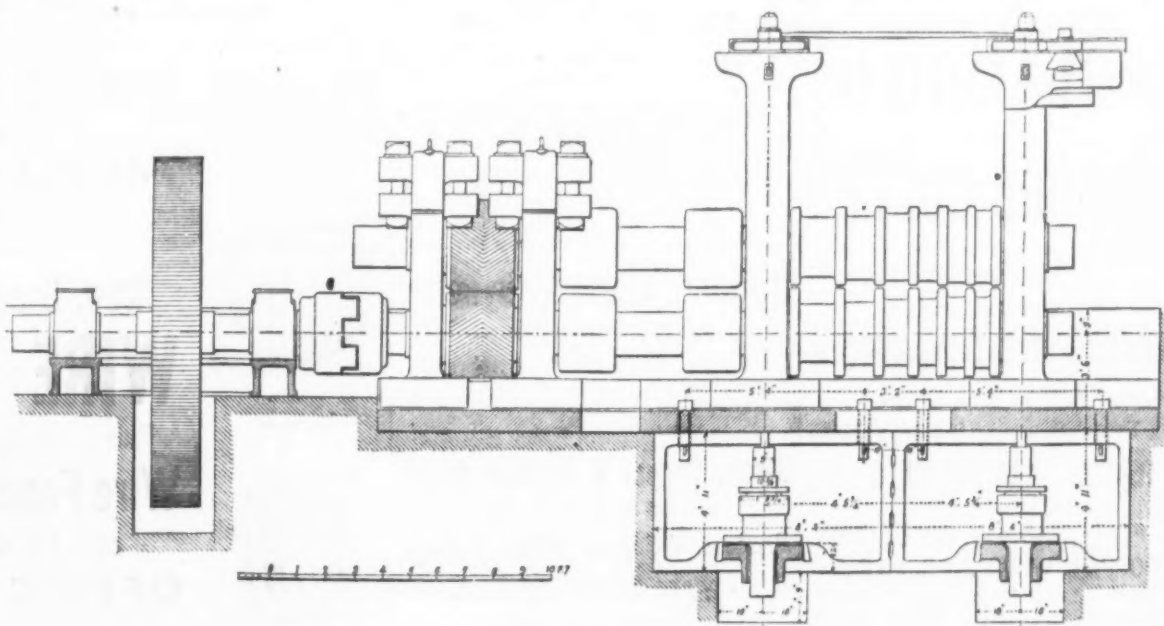


Fig. 1.—Elevation of Train.

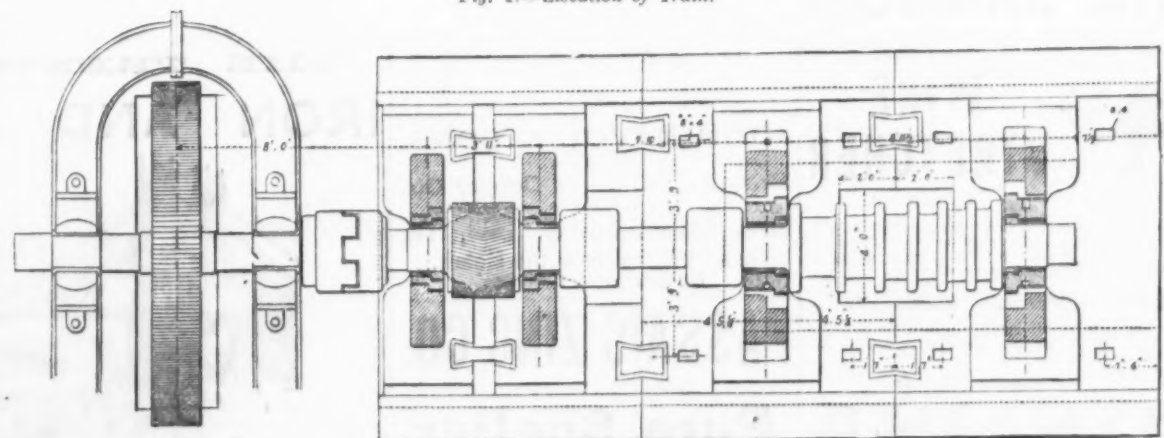


Fig. 2.—Plan of Train.

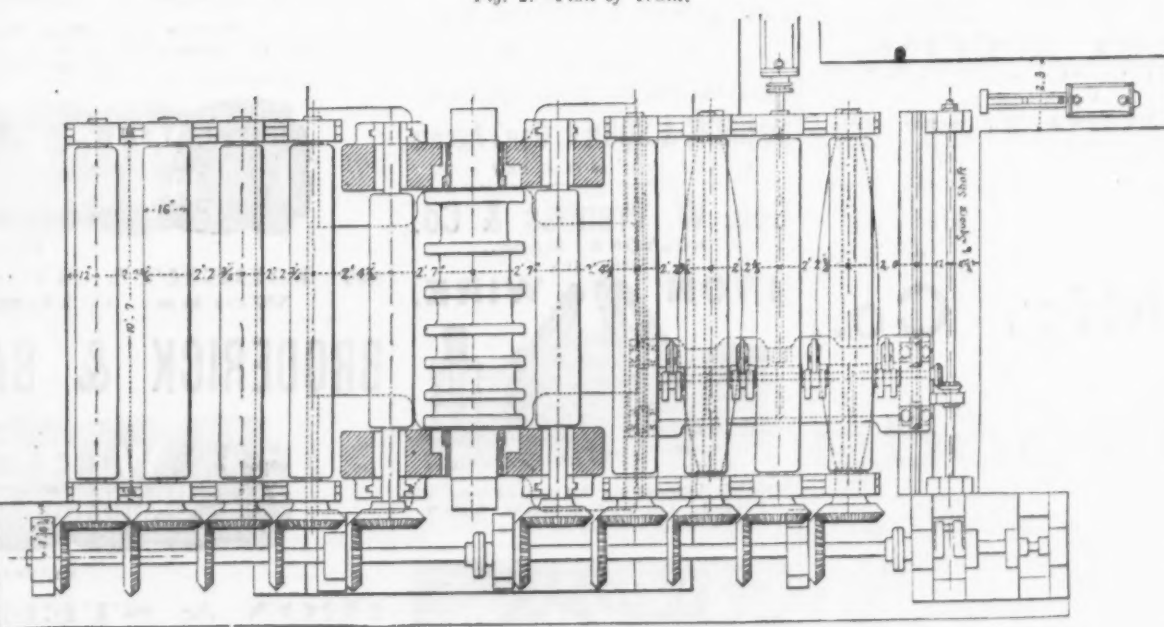


Fig. 3.—Plan of Feed Tables.

BLOOMING MILL WITH BALANCED TOP ROLL AT THE EBBW VALE STEEL WORKS.

pumped, and we have all that is desired. This is a very grave error. Many boilers have been ruined, and we make the assertion with the confidence born of long experience) a large number of destructive explosions have been directly caused by introducing the feed-water into boilers at the wrong point. On the location and construction of the feed depends to some extent the economical working of a boiler, and to a great extent, especially with certain types of boilers, its safety, durability and freedom from a variety of defects, such as leaky seams, fractured plates, and others of a similar kind. And it is unfortunately true that the type of boiler which from its nature is most severely affected by mal-construction such as we are now speaking of is the very one which is the ofttest subject to it. We are speaking

through the wall, and here the feed-water is introduced, whether hot or cold, and there is really not so much difference after all between the two, for, no matter how effective a heater may be, the temperature to which it can raise water passing through is quite low compared with the temperature of the water in the boiler due to a steam pressure of, say, 80 pounds per square inch. The difference in the effect produced by feeding hot or cold water at the wrong place is one of degree, not of kind. When a boiler is under steam of, say, 80 pounds per square inch the body of water in it will have a temperature of about 324° F., and the shell plates will necessarily be somewhat hotter, especially on the bottom—just how much hotter will depend entirely upon the quantity of scale or sediment present. Now in-

We know that wrought iron expands or contracts about 1 part in 150,000 for each degree that its temperature is raised or lowered. This is equivalent to a stress of 1 ton per square inch of section for every 15°. That is, suppose we fix a piece of iron—a strip of boiler plate, for instance—¼ inch thick and 4 inches wide, at a temperature of 92° F., between a pair of immovable clamps. Then, if we reduce the temperature of the bar under experiment to that of melting ice, we put a stress of 4 tons upon it, or 1 ton for each inch of its width. Now, this is precisely what happens when cold water is fed into the bottom of a boiler. We have the plates or the shell at a temperature of not less, probably, than 350° F. A large quantity of cold water, often at a temperature as low as 50° F., is intro-

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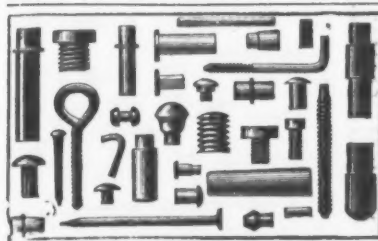
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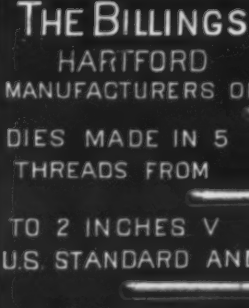


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Modern Automatic Sprinklers.

Mr. C. J. H. Woodbury, of Boston, has

been paying a good deal of attention to the

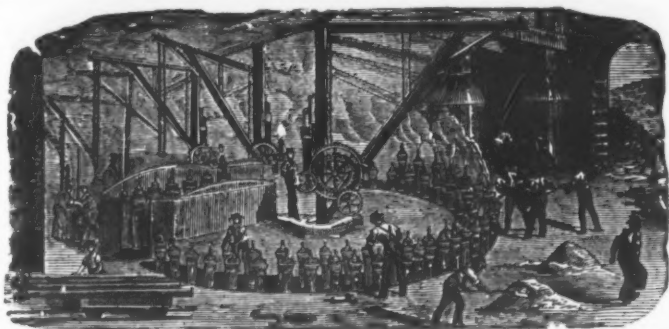
subject of the extinction of fires by automatic

sprinklers. A paper presented by him be-
fore the Society of Arts of Boston contains,
after an introductory historical sketch, the
following summary of modern developments
in this important field:

Mr. Henry S. Parmelee, of New Haven,

was the inventor of the first successful au-
tomatic sprinkler, but previous to making
the sprinkler which has been so extensively
introduced he attempted, after the preced-
ent of former inventors, to construct asprinkler wherein the water was kept from
entering the sprinkler by means of a valve
which was held to its seat by a lever secured
by a link of fusible alloy. His experimentsshowed that there was an elongation of the
link, and therefore a spring was attached to
take up the lost motion caused by the stretch
of the link, and preserve the thrust against
the valve. After thorough and careful workin the endeavor to make a valve sprinkler
ready for efficient use under all circum-
stances of fire, and yet with no liability to
leakage, he seems to have abandoned all hope
of making a satisfactory valve sprinkler, and
used an upright rose head covered by a brasscap soldered below the orifices. Afterward,
the revolving head, which consisted of a
small reaction turbine, was used, and later
the form of the sprinkler was modified soas to allow the direct access of heat to both
sides of the soldered surface, and the same
construction prevented the body of the sprin-
kler from being expanded into the cap, as was
of frequent occurrence in the original form,where a 1/2 inch pipe was screwed into the
middle of the sprinkler. There were nu-
merous difficulties in the manufacture of the
sprinklers, especially in regard to the solder-ing, and the methods which were finally
found to be uniformly successful are known
to but few persons. The manufacture and
commercial development of the Parmeleesprinkler, in the later and improved form,
was carried on by the Providence Steam and
Gas Pipe Company, which, it is estimated,
has put up considerably in excess of 150,000Parmelee sprinklers. The success of this
sprinkler was naturally stimulating to the
wits of other inventors, but few of whom
accomplished anything of importance.The manufacture of the Parmelee sprin-
kler was supplanted by the one invented by
Mr. Frederick Grinnell, of Providence, R. I.,
which was a return to the early idea of mak-ing a sprinkler containing a valve keeping
the water out of the sprinkler and away from
contact with the solder, but it also included
certain features which solved previous diffi-culties and rendered it, unlike other valve
sprinklers, a successful device, both in sta-
bility and operation. The valve-seat at the
inlet to the sprinkler is placed in the middleof a flexible diaphragm, against which a de-
flector with a serrated edge is held by a pair
of compound levers, secured at one extremity
by fusible solder. When the levers are re-leased by the fusion of the solder, the flexible
valve-seat permits the valve to move without
opening until the soldered joint is wholly
free, thus avoiding the liability of any leak-ing water cooling the solder and fixing a par-
tially open valve. There is a distinction of
great importance between the operation of
the piston-valves which move without open-ing, and the operation of the valve in the
Grinnell sprinkler, wherein the valve keeps
stationary against its seat without any
change in the relation of parts to each otherduring the movement preliminary to opening,
instead of being obliged to slide along a sur-
face with the chance of either leaking or
meeting an excessive resistance. The areaof the portion of the flexible diaphragm sup-
porting the valve being greater than the area
of the valve, the water pressure tends to
keep the valve tight as long as the resist-ance of the levers keeps the valve in place;
when the melting of the solder takes away
this resistance, then the water pressure opens
the valve. This simple and ingenious ar-rangement makes use of the same water
pressure to keep the valve tight when it
ought to be tight, and to force it open when
it ought to be open. The soldered joint ofthis sprinkler is reinforced by a piece of
wire in the form of the letter L, which
makes a compound joint lying in three planes,
and which can be readily inspected for any

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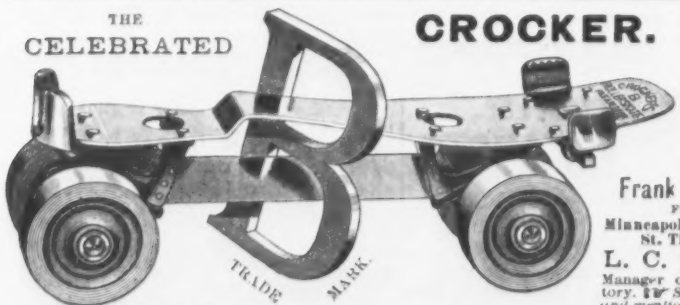
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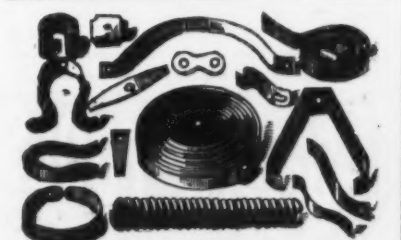
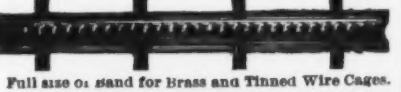
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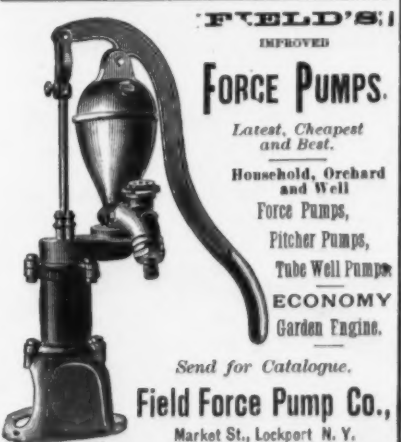


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done so promptly as to forestall the need for
quired for sanitary purposes, so that it is
widely known if the water is suffered to be
drawn for more than 2 feet below the top of
the tank. Branch pipes at the top of such
room vary according to the arrangement of
floor beams, but are generally 8 to 10 feet
apart in either direction. In the case of the
upright sprinklers as made a few years ago,
the pipes must be hung low enough to pass
under the beams, while with the later forms
of pendent sprinklers the pipes are secured
to the ceiling midway between the floor
timbers, away from interference with belts
and shafting. The use of such a system
with the pipes full of water is applicable only
to places where there is no liability of freez-
ing. In buildings which are not heated it
is necessary to shut the main valve and
draw the water from the pipes during the
cold weather, thus limiting the operation of
the sprinklers to the chance that some one
will discover the fire in time to open the
valve.

There have been a great number of appli-
cances devised for the purpose of admitting
the water into a dry sprinkler system, but
few of them have ever been introduced, and
their complications are generally too great
to give assurance of their operation after a
long interval. The Walworth Mfg. Co. have
made recently for this purpose a device
whose simplicity and efficient operation at
tests have been very satisfactory. It con-
sists of a sheet-metal tank closed at one end
and resting mouth downward in a larger
tank of water, after the manner of a gas-
ometer, and in communication, through a
check-valve, with the sprinkler system,
which contains air to the pressure of about
1 pound to the square inch. When the
opening of a sprinkler reduces the pressure
the floating tank falls, and its weight pulls
open a lever-valve of peculiar construction;
as it is provided with two fulcrums, the one
with greater leverage is called into play
at first, and as the valve is partially opened
the leverage diminishes, producing quicker
action upon the valve. The relation of the
parts is such that an air pressure of 1
pound to the square inch in the pipes results
in a pull of 1500 pounds upon the gate of the
valve. The falling of the tank also actuates
such bell and whistle alarms as may be
required. The Providence Steam and Gas
Pipe Company have a low-pressure air sys-
tem which has been used in the Western
States. Water is prevented from entering
the system by the smaller disk of a differ-
ential piston-valve, which is kept closed by
the pressure of the air in the system, which
rests against the larger disk of the valve. There
are a number of liquids with low freezing
points proposed for the purpose of filling
automatic-sprinkler systems. I do not know
of any solution of low freezing point suited
for such purposes, as being alike non-corro-
sive to brass and iron and incombustible, and
these mixtures form no exception.

The adequacy of pipes for a system of
sprinklers is a matter of great importance.
The following table is based on allowing a
uniform loss of head throughout a system
giving a discharge of 1 cubic foot per minute
by each sprinkler from the first tank supply:

Diam. of pipe.	No. of heads.	Loss by friction. Feet.
3/4	1	1.31
1	1	2.64
1 1/4	1	2.34
1 1/2	10	2.7
2	18	2.8
2 1/2	28	2.6
3	46	2.9
3 1/2	78	3.1
4	115	4.1

Dr. Henry Morton's experiments on the
delivery of sprinklers supplied from a tank
with a head of 10 feet:

Diam. of pipe.	No. of sprinklers.	Cubic ft. per min.
3/4	3	2.576
1	4	5.153
1 1/4	5	6.441
1 1/2	6	11.594
2	10	30.611
2 1/2	25	32.305
3	36	40.375
3 1/2	49	63.122
4	64	82.445
5	100	128.819
6	144	185.5

From some measurements of the discharge
of sprinklers I found that it was represented
by the formula:

$Q = 5.075 a f \sqrt{p}$
 Q = cubic feet per minute.
 a = area of orifice in square inches.
 f = coefficient of efflux.
 p = water pressure in pounds per square
inch.

These constants were as follows for the
sprinklers tested:

Kind of sprinkler.	Area of or- ifice, sq. in.	Coefficient of efflux.	Cubic feet discharged, 5.075 a f.
Parnellee	176	.5356	4784
Grinnell	1963	.5576	5555
Brown's standard	2517	.491	6144
Brown's sensitive	2345	.4616	6999
Walworth	1963	.5692	7093
Bishop's upright	355	.4988	7395
Bishop's spring deflector	2769	.6968	9732
Bishop's valve deflector	2440	.5731	9498
Burritt's rose	358	.4791	6273
Burritt's open base	978	.1717	8531
Burritt's sensitive	1703	.8265	6927
Harris deflector	1963	.7325	7298
Harris closed	1428	.718	5167
Whiting	184	.5777	5366
Health	22	.5224	5692
Kane	1665	.7397	6169
Ruttenburg	3068	.4965	7492

The alloy described as fusible at low tem-
peratures in connection with automatic
sprinklers is referred to in patents issued
early in the century, and I have been unable
to learn the origin of such alloys, which must
have been, from the nature of their constitu-
ents, comparatively modern. The composi-
tion generally used consists of one part each
of tin, lead and cadmium, and four parts of
bismuth. The melting point is changed by
slight differences in the composition and of
the purity of the several constituents. Such
an alloy softens at 165° F., and becomes per-
fectly liquid at about 170° F. A sprinkler
opens at the critical point in the alloy, or at
about 163° F., when it loses its tenacity and
becomes granular. Skillful manipulation is
essential in order to obtain the desired re-
sults, both in the mixing of the alloy and in
its application to soldering. There are about
50 of these alloys melting at temperatures
below 250° F., and some of them soft and
ductile, while others are hard and brittle.

The composition of these mixtures is wholly
empirical, not forming true alloys. Prof.
Frederic Guthrie, F. R. S., president of the
Physical Society of Great Britain, has inves-
tigated their composition, heating them in
linen bags immersed in water kept at a con-
stant temperature, and on subjecting to
analysis the alloy which passed through the
fabric of the bag at certain temperatures
the constituents of the true alloy and the re-
lations of various metals which unite to form
true alloys were determined. The alloy of
minimum fusibility melted at 159.8° F., and
was composed of

Bismuth	47.38
Lead	19.36
Cadmium	13.29
Tin	19.97
Total	100

It is a matter of importance to know
whether the melting point of the fusible
alloy increases in the course of time. I have
in the endeavor to determine that question
immersed bars of solder 10 years old in
water, and, after noting the changes of con-
dition as the water was slowly heated, so that
when it became cool the bar was in the same
molecular condition as when first made. On
repeating the test of fusion the melting
point of the alloy was found to be the same
as when tried before. From the results of
similar tests upon old sprinklers I could not
learn any indications of a change in the
melting points of the solders.

There have been numerous experimental
tests of automatic sprinklers, wherein they
were necessarily subjected to artificial con-
ditions, whose value was measured by their
approximation to the conditions imposed by
actual fires in buildings. It was by such ex-
perimental fires that the underwriters and the
public were first convinced of the value
of this apparatus, but it is not my intention
to allude further to such experiments, as the
automatic sprinklers have been in use for a
length of time sufficient to furnish a record
which will establish the facts in regard to
the efficiency of their operation. The first
fire upon property protected by sprinklers
occurred early in 1877, and for several years
their use was almost solely confined to the
protection of property insured in the Factory
Mutual Insurance companies of New Eng-
land, and from the books of these companies
I have compiled the records of fires and
losses for the period of eight years from
January 1, 1877, to January 1, 1885, divid-
ing them into two lists, according to whether
or not automatic sprinklers formed a portion
of the apparatus.

Fires on property protected by automatic
sprinklers and insured in the Boston Manu-
facturers' Mutual Fire Insurance Company:

Year.	Fires.	Claims.	Losses.
1877	4	None.	None.
1878	5	None.	None.
1879	1	1	\$512.77
1880	6	2	1,192.72
1881	8	3	1,345.40
1882	19	5	1,567.97
1883	21	8	20,582.34
1884	33	12	8,978.81
Total	103	31	\$34,178.01
Average loss per claim			\$1,102.51
Average loss per fire			331.82

There have been, in addition to the above,
32 fires over automatic sprinklers on prop-
erty insured only in other mutual insurance
companies, and 90 similar fires on property
where none of the Factory Mutual Insurance
companies had any interest, making the
whole record:

Whole Record of Automatic Sprinkler Fires to
January 1, 1885.

Year.	Mutual Insurance.	Other mutuals only.	Stock insurance.	Total.	Losses.
1877	4	None.	None.	4	None.
1878	5	None.	None.	5	None.
1879	1	1	1	3	\$512.77
1880	6	3	1	10	1,772.19
1881	8	3	1	12	1,345.40
1882	19	6	3	28	2,538.72
1883	21	8	6	35	40,592.40
1884	33	15	39	87	17,949.80
Totals	103	32	60	195	63,833.82
Average loss per fire					327.30

Kind of sprinklers.

Year.	Parnellee.	Grinnell.	Burritt.	Bishop.	Walworth.	Brown.	Conant.	Harris.	Ruttenburg.
1877	3							1	
1878	5								
1879	1								
1880	6								
1881	8								
1882	15	3	3					1	
1883	21	3	3						
1884	33	15	3						1
Totals	86	18	6	3	2	2	2	1	1

Which is practically identical with the average
loss from such fires in the Boston Manu-
facturers' Mutual Fire Insurance Company
only, as shown by the first table.

In comparison with the foregoing results
the following table shows the experience of
those fires upon property insured in the Bos-
ton Manufacturers' Mutual Fire Insurance
Company where automatic sprinklers did
not form any portion of the protective ap-
paratus:

Fires on Property Not Protected by Automatic
Sprinklers, and Insured in the Boston Manu-
facturers' Mutual Fire Insurance Company.

Year.	Fires.	Claims.	Losses.
1877	44	32	\$788,886.95
1878	62	36	293,585.26
1879	45	17	50,863.32
1880	80	30	775,008.36
1881	76	31	454,883.03
1882	120	32	866,873.93
1883	70	25	482,980.91
1884	66	36	657,136.29
Totals	553	227	\$4,310,108.05
Average loss per claim			\$19,007.26
Average loss per fire			7,794.06

The following comparison of averages for
the purpose of stating the measure of the
benefits derived from the operation of auto-
matic sprinklers is based upon the whole
number of fires, and not upon the whole
number of claims, because it is a comparison
of the efficiency of apparatus in the preven-
tion of fire, and each system should have
the credit of extinguishing any fires, if be it

Paris, 1878.

**McCAFFREY & BRO.,**

PENNSYLVANIA FILE WORKS

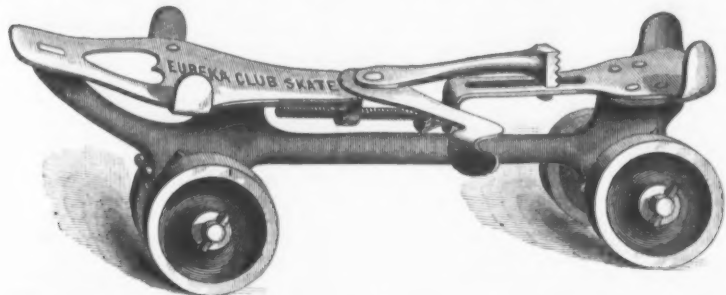
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Manufacture and keep in stock a full line of **FILES** and **RASPS** only for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

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The above cut represents the "EUREKA" Roller Skate, the **Most Complete and Most Perfect** in the Market. The clamp and foot-plates are made of Steel. **Simple, Durable and Easily Adjusted.**

When fastening this Skate to the shoe, the heel-clamps are stationary. The toe-clamps are drawn together, and the corrugated bar pressed back against the heel simultaneously by one motion of the lever, which is under the instep and cannot by any possibility be thrown out of position while skating, making a most perfect and secure adjustment to the shoe.

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LIGHTNING HAY KNIVES. WEYMOUTH'S PATENT.

This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 30 pounds weight, suitable for shipping by land or water to any part of the world.

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For sale by the Hardware trade generally.

CAUTION:

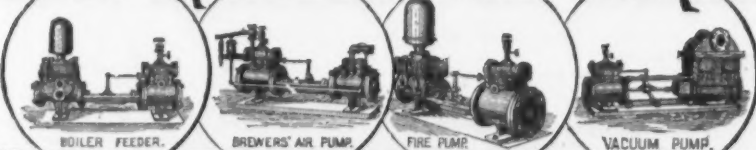
We are informed that various parties are infringing upon the widely known Letters Patent granted originally to George F. Weymouth, for an improved Hay knife.

The characteristic feature of the invention is a curved blade, provided with saw-tooth cutters, and furnished with suitable working handles. It is our purpose to prosecute all infringers of our patent, and have already commenced one suit, which is nearly ready for hearing, and are about commencing suits against other parties.

All manufacturers are hereby warned of our rights, and the public are cautioned against purchasing any Hay "Saw Knives" which are not of our genuine manufacture.

HIRAM HOLT & CO.

EAST WILTON, May 26, 1884.

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INDIANAPOLIS, IND. SEND FOR CATALOGUE AND PRICES.

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Flat Equaling,
Flat Wood,
Gang Edger,
Ginsaw,
Gulleting,
Half-Round,
Half-Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-End),
Handsaw Taper, single-cut,
Handsaw Taper, double-cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,
Square Blunt,
Square Equaling Files,
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Three-Square Blunt Files,
Tumbler Files,
Union Cut,
Warding Files,
Warding Blunt File,
Warding Round Edge File,

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Flat Wood,
Half-Round Shoe,
Half-Round Wood,
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BLACK DIAMOND FILE WORKS.

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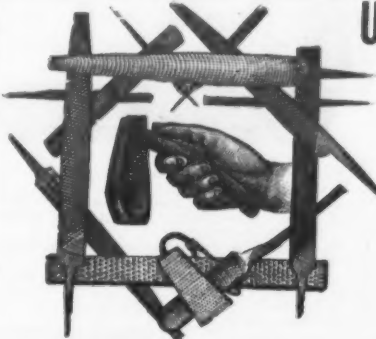
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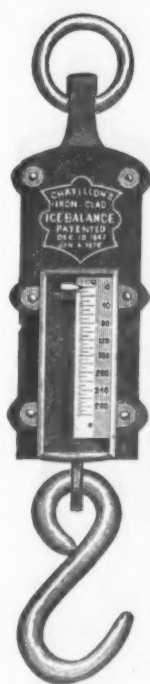
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Simple, Inexpensive, Accurate.



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Has on hand some variety

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Union and Field Hoes, Shovels

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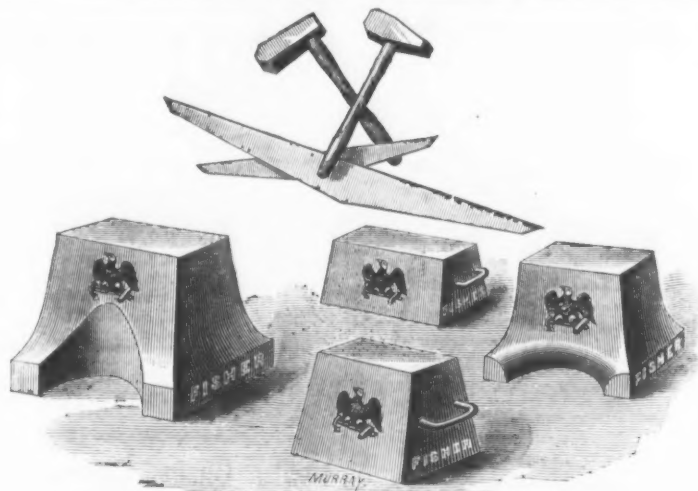
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For Smithing or Blocking, Warranted Better than Any Other Make.

Superior, because face is in ONE PIECE OF JESSOP'S BEST CAST STEEL, of uniform, hardest

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"Cross-Pene" and "Dog-Head" Hammers, of Solid Cast Steel,

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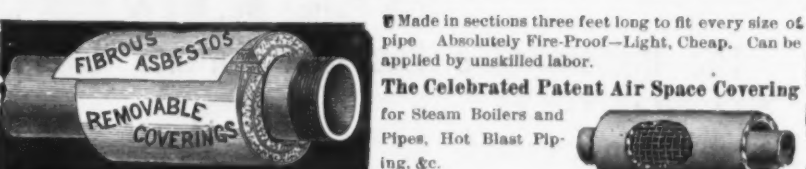
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Punches.

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Made in sections three feet long to fit every size of
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The Celebrated Patent Air Space Covering
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PATENT SPOOL WIRE FOR THE RETAIL HARDWARE TRADE.

Dealers who handle it do away with the **Broken Bundle Business** and sell small quanti-
ties by the spool only. It is a convenience for both dealer and consumer. It is **Shellac-Coated**
and cannot rust; it is wound
like spool cotton on a **Quarter
Pound, Half Pound and
One Pound Spools**, one
dozen spools in a box.
Our spooled **Hair Wire** is
the best in the market.

FOR SALE TO THE TRADE BY
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SEND FOR ILLUSTRATED PRICE LIST.
SPECIAL WIRES FOR MANUFACTURING PURPOSES ON ANY SIZE OF SPOOL.

JOHN WALES & CO.,
239 and 241 Franklin St.
BOSTON, MASS.
Eastern Agents.

Manufacturers and the Trade are warned not to infringe on our patent, No. 294,760, either by manufacturing
or selling.

the service of the insurance adjusters. If
the automatic sprinklers operate so much
more promptly that the ratio of claims to
losses is less, they are certainly entitled to
credit for it. In the record of all fires cited
in this connection nearly 39 per cent. are
followed by claims, while of the automatic-
sprinkler fires alone about 30 per cent result
in an appreciable loss.

Average of fires without sprinkler pro-
tection \$7,394.05
Average of fires with sprinkler protection 331.82

Difference \$7,062.23

Number of fires on property insured
in the factory mutuale and protected
by automatic sprinklers, 135.

Saving, at \$7,062.23 per fire \$1,007,401.05

Number of fires on property not in-
sured in the factory mutuale and
protected by automatic sprinklers,
50.

Saving, at \$7,062.23 per fire 447,733.50

Estimate of total saving \$1,455,134.55

This method of computation is against the
work of automatic sprinklers, because they
were at first limited to the protection of the
more hazardous portions and processes of
mills, and it is quite recently that they have
been placed over the whole of property, in-
cluding those portions generally considered
as being less liable to destruction by fire;
and this estimate of \$1,500,000 as the measure
of the saving caused by automatic
sprinklers is clearly an understatement of
the true amount.

The efficiency of the present method of
mill protection is shown by the results of the
business of the Factory Mutual Insurance
companies for the year ending May 1, 1885:
Policies, \$392,034,693; premiums, \$3,480,-
157.63; losses, \$571,741.82, the fire losses
being 14.58 cents on \$100, and the cost of
administration about 2 cents more, making
the total cost of insurance about 1/6 of 1 per
cent. The fire tax, including the cost of
sustaining insurance companies and fire de-
partments, has now reached in this country
\$16,000,000, which is the heaviest single
tax, forming a burden grievous to be borne,
not merely from its large amount, but be-
cause the greater portion of it is not accom-
panied by any redistribution. In the light
of the logic of numbers contained in the re-
cords presented, how can the conclusion be
doubted as to the most efficient method of
protecting the large portion of the wealth
and prosperity represented by the industrial
establishments of this country?

**New London, Connecticut, as a
Manufacturing Site.**

The citizens of New London, Conn., are
directing the attention of manufacturers
who are in search of desirable sites for their
works to the unusual advantages which
that city affords. They have been success-
ful in attracting the attention of several
manufacturing concerns, and these upon in-
vestigation have found the facilities so ex-
cellent that they have decided upon that city
as their future location. Among the removals
which have recently been made may be men-
tioned the Hopson & Chapin Mfg. Co., who
have just got into fair running order after
removing their works from Weathersfield,
Conn. New London was famous many
years ago on account of its whale-fishery in-
dustry. Some of the most notable whale
fleets ever equipped sailed from that port,
and in time the citizens grew wealthy
from this source. With the discovery
of petroleum, however, the whaling in-
dustry began to wane, and to a certain extent
the prosperity of New London departed
with it. It was no longer specially promi-
nent among the active towns of the general
vicinity of which it was a part, although
there was abundant wealth left among its
citizens. The whaling industry, being so
unlike the modern manufacturing enterprise
which characterizes many Connecticut
towns, may account in some measure for the
backwardness of her citizens in engaging in
manufacturing or in attempting to promote
the establishment of new industries. It is even
charged by some that there was a sentiment
among the older inhabitants against manu-
facturing enterprises, and that they were
frowned upon rather than encouraged.
Whatever may have been the reason, it is
undoubtedly true that New London is far
behind all the other cities of similar rank
in Connecticut and the other Eastern States
in the way of manufactures. Notwith-
standing this the town possesses unusual ad-
vantages in respect of locations for manu-
facturing purposes.

New London has one of the finest harbors
on the Atlantic coast—so fine, indeed, that
many years since the Government located a
navy yard some 2 miles above the city, on
the Thames River, the mouth of which af-
fords excellent anchorage. According to
the statements of prominent naval authori-
ties New London harbor offers one of the
best rendezvous for fleets on our entire At-
lantic seaboard. It has also been commended
to the Secretary of the Navy as a desirable
place for cruisers and other craft to remain
when not in active service. Along the banks
of the river, and around several "coves" of
good size which form parts of the bay, there
are excellent manufacturing sites. Many
places can be selected with deep water on
the one side, insuring water freights on ma-
terials and on manufactured goods, and rail-
roads on the other side. We understand
that, although several manufacturing con-
cerns have recently located in New Lon-
don, there is as yet no speculation in
property, and that desirable sites are avail-
able at reasonable figures. The old element
in New London, which, as we have before
said, was supposed to be inimical to manu-
facturing industries, has given place to
younger men who are progressive, public-
spirited, and withal intelligent in their
enterprise. A board of trade has been organ-
ized, and every facility is offered to concerns
seeking locations to find what they desire.
With reference to the relative economy of
manufacturing in a town situated like New
London, and in which both water and rail
freights are available, as compared with
manufacturing at an inland point—as, for
example, Hartford—it may be mentioned
that one concern which has recently located
in New London estimates the saving in
freight as compared with the vicinity of
Hartford equal to a little more than \$1 per

gross ton on all materials purchased and all
goods shipped. In these days, when manu-
facturers' profits are reduced to a minimum,
a saving of a dollar a ton on freight is an
item well worth considering.

**Efficient Machinery vs. Cheap
Machinery.**

Whenever machinery is to be bought for
any purpose whatever there is the choice
between what may be characterized as ef-
ficient machinery and that which is correctly
designated by the term cheap machinery.
Since all business is conducted primarily for
the purpose of making money, and since a
dollar saved is likened unto two dollars
earned, the temptation to purchase cheap
machinery rather than the more expensive
and likewise efficient machinery that may
be had is constantly before the manufac-
turer. It often requires a long head, so to
speak, to see the greater economy in a ma-
chine costing \$1000 over something else that
might answer the purpose costing perhaps
only \$250. Problems of this kind are con-
stantly presented and must be decided day
by day, and the choice made determines in a
great measure the success of the enterprise
in which the machinery is used, or at least
fixes the plane upon which the business is to
be conducted.

In the manufacture of architectural sheet-
metal work, about the only appliances avail-
able in the past have been of the class we
have designated as cheap, but at present
there is the same choice in this line of trade
that there is in others. At the outset the
tools and machines for making cornice-work
were exclusively home-made. They were
very naturally of the crudest description
and required frequent repairs, while the
labor necessary to operate them was exces-
sive. In the course of time, however, cor-
nice machinery came to be built by regular
machine builders, and a great step in ad-
vance was made. Better machines were
then available, and the labor of operating
them was less than with the old home-made
appliances. At that time cornice-makers
had the choice between home-made machines
and machines built in shops specially de-
voted to their production. In the progress
of time home-made machines disappeared
entirely and factories for the production of
cornice machines multiplied, and for a time
the choice lay between machines of sev-
eral different makers, all being upon
about the same level or of the same
grade. Gradually, however, still further
advance has been made, and the list of
available tools for use in the business has
been greatly increased until at present
the choice is not between a number of ar-
ticles of about the same quality, but rather
between cheap machines and efficient ma-
chines—between temporary makeshifts and
well-designed, thoroughly constructed ma-
chines. The cornice manufacturer now is
called upon to choose between a mallet in
the hands of a workman for smoothing the
burr on the edges of cutwork, and a ma-
chine driving a mallet at the rate of several
hundred blows a minute. He likewise has
the choice between a prick punch and
mallet in the hands of a workman, for
marking the lines of bends in his moldings,
and a machine that will prick thousands of
sheets, if need be, exactly alike and with
mathematical accuracy, in a tenth of the time
it can be done in the old way. In squaring
shears there is the choice between a poorly-
built foot treadle affair for trimming sheets
and a well-designed machine running by
power, and capable of cutting anything,
from the lightest stock up to No. 12 gauge,
efficiently, accurately and with a minimum
of labor. We might enumerate still other
examples when there is the choice between
cheap and efficient tools—the choice between
those machines, which, though costing less at
the outset, required a large amount of ex-
pensive labor day by day to operate them,
and expensive tools, which are so efficient as
to save the annual interest on their cost
every week they are used.

As between a tool costing, for example,
\$50 and another \$150, supposing the two
are equally efficient and serviceable, there
can be no argument. The cheaper tool is to
be preferred. But if the more expensive
tool will do a larger amount of work with
the same labor to operate it, or will outwear
three of the cheaper tools, then the difference
in first cost is fully overcome, and the better
machine is to be preferred. This, we take
it, is a fair illustration of the principle that
is to be observed in selecting tools and
machines for use in the cornice business at
the present time. Too many shops are in
existence equipped with cheap appliances to
make the trade profitable for any of them.
While all are on the same plane there is but
little opportunity for the success of any; but
a change in equipment would seem to prom-
ise important advantages to those who are
enterprising enough to improve the oppor-
tunity.—*The Metal Worker.*

**The Projected Bourdais Tower at
Paris.**—Mr. J. Bourdais has presented to
the Society of Civil Engineers a project that
concerns the erection of a masonry tower
984 feet in height. After an examination of
the different geometric profiles realizable,
Mr. Bourdais has adopted the column as
being more apt than any other form to
satisfy the rules of aesthetics, and also as
being the most stable. In fact, the highest
chimney in the world—that of Saint Rollox,
near Glasgow, 433 feet in height—has been
submitted to numerous storms without suf-
fering therefrom, and, as other chimneys
exposed to great wind pressure have never
given rise to any accident, it results that a
cylindrical form is one that should be
adopted. In short, Mr. Bourdais' structure
would consist of a base 216 feet high, in
which would be established a permanent
museum of electricity. Above this would
rise a six-story column surmounted by a
roof, forming a promenade and capable of
accommodating 2000 persons. The central
granite core, 60 feet in diameter, would be
surrounded with an ornamental framework
of iron faced with copper. This would be
divided into six stories, each containing 16
rooms, 16 feet in height and 50 feet square,
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NOW, This, in testimony, that, in consideration of the forbearance of the Representatives of the said John Wilson to sue me for damages for the wrong aforesaid, I do hereby undertake and agree,
FIRST, to surrender and deliver to the Attorneys for the said John Wilson, all knives now on hand, and in my possession, or under my control, bearing the said imitation trade-mark, and
SECOND, I further undertake and agree to and with the said John Wilson, and his legal representatives, not to manufacture or sell, or cause to be manufactured or sold, at any time in the future, Knives or other Cutlery, bearing his trade-mark aforesaid, or any imitation or simulation thereof. IN WITNESS WHEREOF, I have hereunto set my hand and seal at West Mansfield, aforesaid, this thirty-first day of May, 1885.

WITNESSES:
E. M. REED,
(Attorney for Defendant.)

G. A. ROBINSON, L.B.

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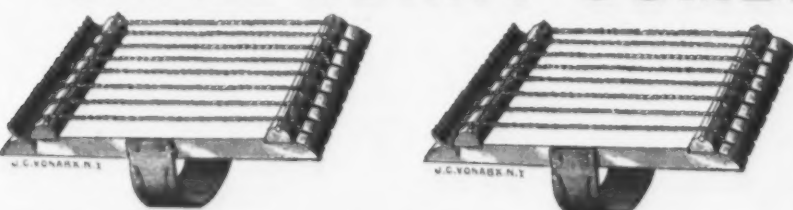
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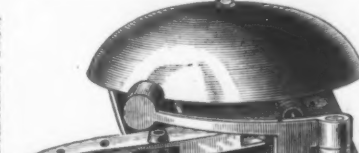
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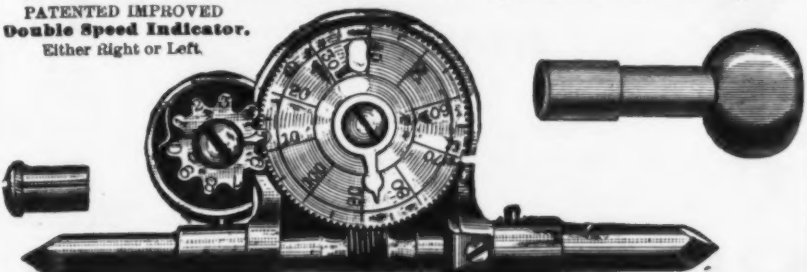
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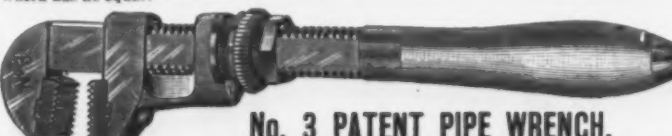
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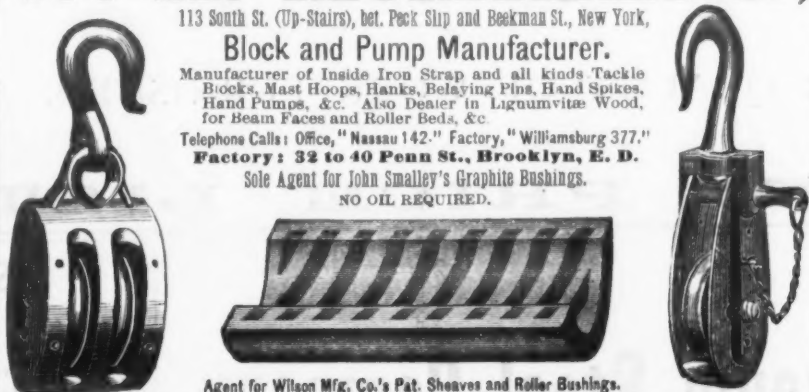
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METALLURGICAL NOTES.

A New Water-Jacket Furnace.

We have watched, at first with interest and then with amazement, the progress of a remarkable invention—through the columns of a large number of our contemporaries. We allude to the description of a wonderful water-jacket blast furnace, for which the world is indebted to Mr. C. L. Hartsfeld, of Newport, Ky. This marvel of a furnace "is adapted for smelting iron, copper, iridium, platinum, jasper, galena, silver, gold, nickel, zinc, tin, manganese, bismuth, chrome and other ores." How zinc is to be smelted in a water-jacket is not explained, nor is it easy to understand what good there can be in putting jasper through such a fiery ordeal. We are told that "the novelty consists chiefly in the cooling of the smelting furnace by water, without using an air-tight water space. The inner cylinder can expand and contract without any resistance as to temperature; the consequence is that repairs are hardly ever required. The smelting process can therefore be kept up continuously without interruption; the upper part of the furnace never gets hot, and the coke or wood does not begin to burn until it arrives at the lower part, where the smelting process takes place at once by a very strong blast. The extraction of the precious metals in this furnace is accomplished by gravitation, the heavier taking the lead, and each coming forth from the top-hole of the lower reverberatory in the order of its weight and worth. There is consequently no dealing with bullion alloys, and if an ore will yield anything over 4 ounces of silver to the ton the furnace is as inexpensive as to remunerate the miner. As it is generally the custom in Western mining to reject all ores that do not show over 15 ounces to the ton, it will be seen that there is by this device a large margin for profit even on what are called poor ores."

To the average American metallurgist this is simply incomprehensible nonsense, but it is straining a point too far when the following is added: "As an illustration of its perfect working may be given an abstract from a report published by *Das Vogtsche Volksblatt* on the cost of reducing ores to metal, 95 per cent. of mineral actually converted into metal out of every 100 taken from Hartsgebirge at Clausenthal, Schlesien, argentiferous silver ores. The analysis as made by the eminent practical chemist, Mr. David Stuart, in his report for the Austro-Hungarian Government, at Vienna, is as follows:

Clausenthal Mine Shaft No. 24.

Nickel.....	2.06	Galena.....	39.51
Silica.....	15.21	Blende.....	8.1
Alumina.....	3.21	Silver.....	4.2
Manganese.....	4.45	Gold.....	.1
Copper.....	7.06	Water and loss.....	1.35
Sulphur.....	12.14		
Time.....	74	Total.....	100
Potash.....	1.87		

The cost of reducing ore by the new water-jacketed furnace built by Mr. Hartsfeld, formerly in Colorado and other mining districts in the United States, in a No. 4 furnace of 50 tons capacity, every 24 hours, was as follows:

Pine wood, 10 cords at 9 marks a cord, 90 marks.....	\$22.50
Ten laborers, at 3 marks a day, 30 marks.....	7.50
Two engineers, at 6 marks 40 pfennig.....	3.50
Four teams, at 8 marks a day, 32 marks.....	8.00
Extras daily, 38 marks.....	9.50
Total cost per 24 hours, 208 marks 80 pfennig.....	\$51.00

The value of the ore per ton is \$72. The daily capacity, 50 tons, \$3600. Deduct cost of smelting, \$51, leaving a daily net profit of \$3549, or 14,196 marks."

While it is true that much that is claimed to be "silver ore" is not argentiferous, a few instances of rascality do not warrant the adoption of such a double-barreled term as "argentiferous silver ore." There is a place called Clausenthal in the Hartz Mountains, but it is not within hundreds of miles of "Schlesien," nor is there a Shaft No. 24 anywhere in that district, nor has there been a single ton of ore extracted from the mines of the Clausenthal district during the past 20 years containing 4.2 per cent. of silver. We do not know who Mr. David Stuart is, but, if he ever put his signature to an alleged analysis like that quoted above, his reputation as a chemist is forever wrecked. In conclusion, we may state that if Mr. Hartsfeld has ever worked in Colorado or elsewhere for any length of time he should know that our Western mines are not paid "pauper-labor" wages of the effete mining districts of Europe. The lowest cost of smelting at one of the best located, most modern plants of the West is \$5.60 per ton, and it does not take Mr. Hartsfeld to discover that \$72 is about as profitable a basis for working as can be found in the West in daily quantities of 50 tons. We sympathize with our contemporaries.

The Marchese Electrolytic Process.

The copper trade in all parts of the world is deeply interested in the improvements made in rapid succession in the electrolytic process, which has now been introduced, in one or another form, into Germany, France, England, Italy and the United States. Among the latest referred to in metallurgical literature is that of Eugenio Marchese, of Genoa, Italy, introduced by him two years since at the copper mines of Casazza, near Genoa, and adopted after a trial by the progressive Stolberg Company, of Germany. In its principal features it consists in smelting a part of the copper ores into a matte containing about 30 per cent. of copper, 30 per cent. of sulphur and 40 per cent. of iron. This matte is cast into thin plates which are used as the anodes, while copper sheets are the cathodes. Another part of the ores is roasted and leached, a little sulphuric acid being added to dissolve copper oxides. This solution constitutes the bath in the electrolytic vats. The sulphate of copper in solution is decomposed and is deposited on the cathodes, while the anodes are attacked. The iron salts and the sulphuric acid formed prevent the precipitation of the iron or the disengagement of hydrogen, while the copper deposits firmly as pure metal at the cathodes. The copper in the solution escaping from the vats is precipitated by sulphureted hydrogen, the precipitate being added in the first smelting process. The greater part of the electromotive force required for the de-

composition of the sulphate of copper is furnished by the oxidation of the iron in the anodes, so that the potential required for each bath is less than 1 volt. The residue of the anodes, consisting chiefly of sulphur, is used for the manufacture of sulphuric acid. The minimum yield per horse power per day by the Marchese process is 20 kilograms.

Plant and Processes.

A cut steel nail with a stronger head than heretofore made has been patented by J. Young, of Wheeling, W. Va. The inventor states that the defect in the heads of the nails heretofore made resulted principally from the fact that the header would abruptly disarrange the fibers in the head. To remedy this defect the dies which hold the blank are provided at the top with a tapering groove. When the header comes down it crowds the metal into the groove to form a concave swelling neck. The fibers of this neck are parallel, more or less, with those of the body, so that no sharp angle of weakness is said to be left. Furthermore, the body of the nail is not grasped by the dies for about 1/4 inch from the head, and therefore the hot metal is not crystallized before being headed by the contact of the dies close up to the head.

H. Schulze-Berge, of Rochester, Pa., has patented means for preventing the clogging of the tuyeres in a fixed converter. The tuyeres are formed of removable blocks of refractory material, each inclosed at the outer end by an air chamber to which a blast-pipe is connected. The blocks surround a metallic blast tube, which at its upper end is fastened to the metal barrel of a stop-cock or valve. This valve has a stem which extends across the air chamber, and which contains a port that connects the tuyere with the air chamber. The valve stem is attached to a hand lever. The lower end of the tuyere is provided with an enlarged mouth of equal or greater cubical capacity above its lower end than that of the tube above the mouth. This mouth acts as a trap to inclose air when the converter is filled with metal above the tuyeres, so that even when the valve is closed the molten metal can rise only far enough to compress the entrapped air sufficiently to establish an equilibrium between it and the weight of the column of molten metal in the converter.

The Trenton Iron Company, of Trenton, N. J., are the assignees of the patent right in a new metallic fabric to be used for fencing, bed bottoms, screens and for similar objects. The uprights of this fabric are composed of corrugated or wave-like rods of elliptical form in cross-section. The horizontal binding cables are each composed of two wires twisted together. The wires are twisted for a short distance, and are then spread apart for the introduction of an upright, after which they are again twisted until the place for the next upright is reached. The office of the corrugations in the uprights is to form seats for the wires, while they serve at the same time to impart a good appearance to the completed fabric.

W. Huston, of Wilmington, Del., has patented a perforated tile for furnace linings to be used for subdividing the products of combustion, or the incoming fresh air. These tiles have heretofore generally been made of the ordinary fire-clay, which was apt to become vitrified and would then clog up the holes. The new tile is made of glassmaker's clay, a composition used by glassmakers in the manufacture of their melting pots. This composition consists mainly of German clay mixed with old pulverized melting pots and with coarse sand. The inventor states that he has made perforated slabs from this material 2 1/4 inches thick, with holes of 3/4 inch in diameter and a little over an inch from center to center, and that these slabs have resisted intense heat without any such fluxing as to obstruct the perforations.

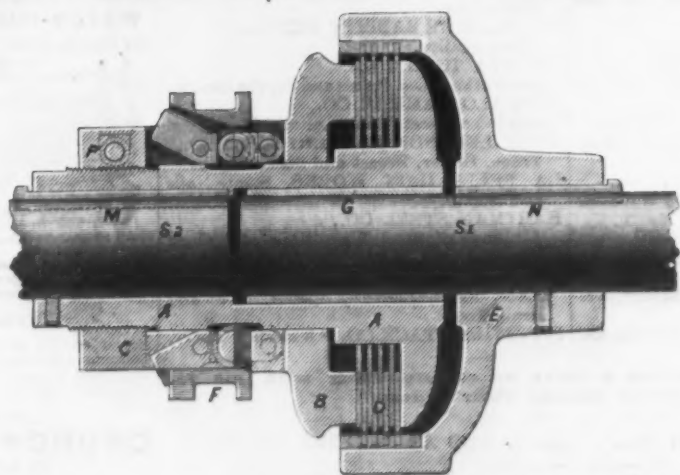
A mold for casting steel, which is provided with an attachment for condensing the latter by gaseous pressure, has been patented by J. Henderson, of Bellefonte, Pa. The cover and base are connected to the body of the mold in such a way that they will not be separated under severe internal pressure. The connection is formed by lugs attached to the several parts, and joined by means of keys and wedges driven through or between the same. To the under side of the cover there is attached an inverted shallow cup made of thin sheet metal drawn to the required shape in a die. This cup is made to contain a pasteboard chamber, which receives a charge of powder. The bottom of the chamber is forced out by pressing upon a plunger which projects upward through the cover. This plunger also displaces the bottom of the sheet-metal cup. The charge falling upon the hot metal beneath burns and generates gases of high pressure, which compress the metal.

A tool for turning very small pinions heretofore made by hand has been patented by E. Horton, of New Haven, Conn. It consists of a wide flat bar adapted to be secured in the toolstock of a lathe, so as to be moved in like manner as a common turning tool. On the upper or working surface of the bar several grooves are made diagonally across it, which leave diagonal ribs between them. The forward edge of each rib is undercut to produce a cutting edge at the upper forward angle of the rib. The height of these ribs gradually increases from the forward rib rearward, while the upper surfaces of all the ribs are parallel to the surface of the bar. Across the surface of each rib recesses are made at right angles to the path of movement, which correspond to the work to be performed. The work is operated upon by the several ribs in succession.

C. Wittenstrom, of Stockholm, Sweden, has patented a casting apparatus for making a number of small castings when the iron is soft or low in carbon. In this case the metal must be prevented from solidifying in the ladle and also from oxidation. To this effect the ladle or its lid is provided with a large gas burner or other suitable heating device. The flame is made to issue out from the lip or mouth of the ladle, so as to surround the jet of metal. In order to pour the metal in a steady, even jet the tipping axis of the ladle is made to coincide with the edge of the lip, and thus the tipping of the ladle does not change the position or direction of the jet. The molds are grouped on a turntable, and may be quickly brought successively under the jet, or the ladle may be swung on a crane if preferred.

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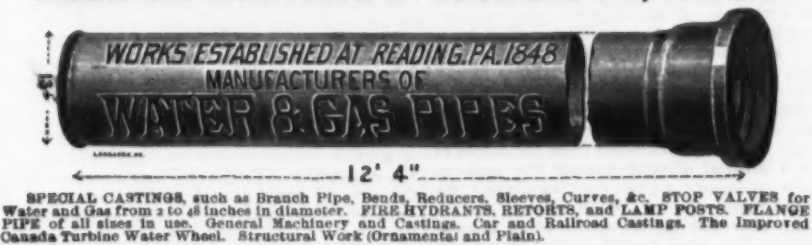
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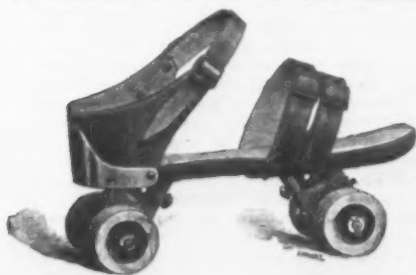
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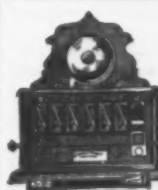
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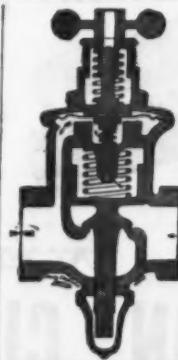
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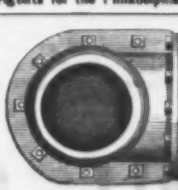
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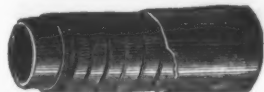
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Seamless Rubber Belt

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Tensile strength, 6000 lbs. for 6 inch wide.

It will not "break" at point of Lacing.

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Samples and Discounts on Application.

Showing the cotton fabric before the Rubber is put on. After the rubber is put on inside and out, the whole is compressed and vulcanized by an 8,000 lb. steam press.

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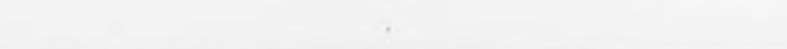
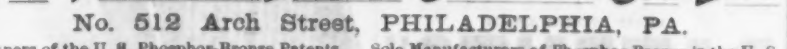
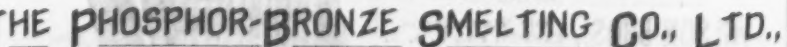
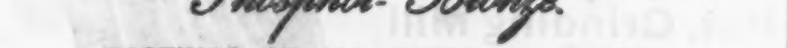
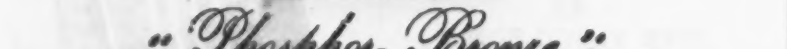
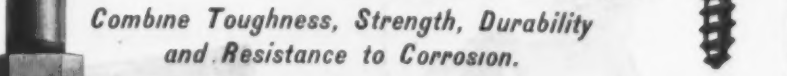
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PUMP RODS, BOLTS and NUTS, MACHINE and WOOD SCREWS, &c., &c.

Combine Toughness, Strength, Durability

and Resistance to Corrosion.

**English Letter.**

(From Our Regular Correspondent.)

LONDON, June 1, 1885.

THE ADVENT OF JUNE

does not find us much, if any, better off than we were at the beginning of January—indeed, it is quite open to question whether we have not gradually retrograded in the meantime. In some quarters there is a distinct and decided impression that we have gone back all along the line, while in others the opinion expressed is that we have been gradually weeding out our weaknesses and so preparing ourselves for that good time which is bound to come along sooner or later. Which of these views is the correct one I do not profess to be able to state, but I would remark that, so far as values afford any reliable indication of the course of events, we are by no means ahead of six months ago. Without attempting to go into exhaustive details it is an admitted fact that almost all crucial prices have been steadily forced down for months past, so that on that head the evidence is crushing and beyond dispute. We have also the testimony afforded by the reserve stocks of pig iron, so far as our statistics in that direction can be depended upon. In Scotland, at Middlesboro' and on the West Coast of Cumberland the reserves have been augmented concurrently with the depression of values, while the shipping returns and other statistics all point to the same conclusion, which is, broadly, that the demand has been of insufficient volume to keep pace with the production, even with the advantage of some of the lowest values ever recorded. It is thus pretty clear, in my opinion, that we shall have some time to wait before we again feel that we are on the high road to even moderate prosperity, not to say anything of a real rush or "boom." Many gaps are yet to be filled up, large stocks must be reduced, values must be equalized and firmed up, and, above all, public confidence in the stability of things must be restored, before our iron and steel trades will march onward. The decline in values as well as in the production of one of our largest districts are plainly demonstrated by the following return of Mr. Waterhouse, the sworn accountant of the Northern Board of Arbitration and Conciliation:

Having collected from the firms and companies belonging to, or associated for this purpose with, your board, the returns of their sales of manufactured iron during the two months ending April 30 last, and having verified the same by an examination of their books, I certify the average net selling price per ton to have been £1. 17/11. Beneath is a statement of the different classes of iron sold, and the average net selling price of each:

SALES DURING THE TWO MONTHS ENDING APRIL 30, 1885.					
Description.	Weight invoiced.	Per-centage of total.	Average net selling price.	£ s. d.	per ton.
Rails...	408 10 2 15	70	4 14 10.92	4 14 10.92	
Plates...	36,398 8 3 30	58.77	4 17 2.51	4 17 2.51	
Bars...	14,575 11 1 13	22.33	5 3 10.11	5 3 10.11	
Angles...	11,840 19 1 25	18.14	4 12 3.88	4 12 3.88	
Total...	63,263 10 1 17	100	4 17 11.2	4 17 11.2	

The following are the figures for the previous two months:

Description.	Weight invoiced.	Per-centage of total.	Average net selling price.	£ s. d.	per ton.
Rails...	408 10 2 15	70	4 14 10.92	4 14 10.92	
Plates...	36,398 8 3 30	58.77	4 17 2.51	4 17 2.51	
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Total...	63,263 10 1 17	100	4 17 11.2	4 17 11.2	

Whether any lasting or considerable effect is likely to be produced by your strike we are yet in no position to forecast. Telegrams state that the strike is pretty general, with certain exceptions, and that it is likely to last all summer. Were that a certainty we might perhaps look for some augmentation of the American demand for British iron and steel, but those among us who have had experience on former similar occasions are too well aware that your manufacturers would not be likely to do anything which would afford undue encouragement to our producers. In any case, however, the dispute will be watched with a good deal of interest on this side, especially as the action of the employers seems to indicate a fixed intention to break-up, or at least to weaken, the power and dominance of the Amalgamated Association.

The Whitsuntide holidays have been very largely and generously observed this year, and, as I predicted, the employers have been only too glad to stop their mills and forges. In numerous cases the stoppage was prolonged for the entire week, and in a few instances several days will elapse, even now, before a fresh start is made. Under these conditions it is not surprising that there is very little indeed that is new to record in connection with the iron trade or its near allies. The current facts and prices I deal with in another paragraph, but I am bound to state that my task as your English "re-cording angel" is just now as difficult and thankless as it has been any time these 12 or 14 years past.

THE IRON MARKET

is once more without changes of importance. Competition is as close and keen as ever, so that excessively low values rule in all directions, and there is no encouragement whatever for consumers to buy ahead, simply because there appears to be "no bottom" to anything. Every new transaction seems capable of yielding a new price, and the change is almost invariably in a downward direction; consequently, buyers think, and probably think rightly, that they cannot do better than purchase on the hand-to-mouth system. Until something takes place to disabuse them of this idea it would be idle to look for any augmentation of the demand or improvement in quotations. At the same time it has to be borne in mind that we are now at a period of the year when a change for the better not uncommonly occurs, so that consumers should watch the course of

the markets closely in order to avoid being "left" should the change take place. At Glasgow there has been only a very moderate amount of business on hand this week, and warrants have been almost unaltered, the closing price being 41/6 1/2 per ton. In Scotch makers' brands of pig iron prices are generally 6d. @ 1/7 per ton easier. Shipments still compare unfavorably with those of last year, and the reserve stocks are not only in excess of the figures of a year ago, but are growing weekly. At Middlesboro' matters are extremely quiet and there is only a very moderate business in hand. Shipments are on a fair scale, but the local consumption is limited. For No. 3 the price is from 42/9 to 43/3 per ton, and the general position favors buyers. Hematite pig irons are dull but steady at about 43/ per ton, mixed numbers in usual proportions, but stocks on the West Coast are very heavy, and the make is still outside the consumption. No doubt the West Coast makers are affected by the progress of the industry in Scotland, Cleveland and elsewhere. In the other smelting districts crude irons are dull and slow of sale. Heavy manufactured iron is in fair output, but activity is exceptional, save at the armor-plate concerns at Sheffield. Fencing wire and galvanized iron are very dull and much cut in values, although in the latter article some good lines are understood to have been booked of late. Ordinary finished iron is quite as nominal and slow of sale as for some time past, the demand being still chiefly for such sorts of bars as are obtainable at from £5. 10/ to £6 per ton. Sheets are in moderate request, as are also nail rods, angles and hoops. Old materials are unchanged at my recent quotations for export. For home use good wrought scrap is quoted in some quarters at £3. 12/6 per ton in London, or £3 17/6 f.o.b. here. Freight is nominally the same at 1/2 @ 2/ per ton for pig iron by ordinary steamers from Glasgow to New York. A fresh outburst of correspondence has taken place respecting the Australasian shipping "ring," and it is alleged that its operations are causing greatly enlarged shipments of goods from the Continent to our Australian colonies, as well as to the East generally. Steel is without change to note, but there is a continuance of activity at the Scotch, &c., works devoted to ship plates, angles and other shipbuilding qualities. Steel rails are as before, on the basis of £4. 15/ per ton for usual heavy sections. A few small orders are given out from time to time, and larger ones are expected from the India Office, as well as from Italy.

SCOTCH PIG IRON

has been stagnant during the past week, and values have undergone a general process of shrinkage, although not to any very great extent. In warrants operations have been limited to the realizations of weak holders who are tired of waiting for what does not come. There are 91 furnaces at work, as against 95 a year ago. In Connal's stores there are 597,367 tons, compared with 590,868 tons last year this date. Last week there was an increase of 799 tons. Shipments to date are 44,512 tons behind, while Middlesboro' pig importations into Scotland have increased by 46,920 tons.

Current prices are:

Deliverable alongside.	No. 1.	No. 3.
Gartsherrie, at Glasgow...	50/	46/
Coltness, " "	51/6	49/6
Langloan, " "	51/6	49/6
Summerlee, " "	49/6	45/6
Calder, " "	52/	45/6
Canabrook, " "	48/	45/6
Clyde, " "	46/3	42/6
Monkland, " "	42/	40/
Quarter, " "	41/9	39/6
Govan, at Broomielaw...	42/	40/3
Shotts, at Leith...	50/	49/6
Carroll, at Grangemouth...	52/6	47/
Kinnell, at Broomielaw...	44/	43/
Glengarnock, at Ardrossan...	47/6	42/
Eglinton, " "	42/3	39/6
Dalmellington, " "	45/6	42/

MIDDLESBORO' PIG IRON

is just about the same as any time these last five or six weeks, business being on a very limited scale at the subjoined prices, which are somewhat nominal for G. M. B. f.o.b. at makers' wharves in the Tees, net cash:

No. 1 Foundry...	35/3	Mottled...	32/6
" " " "	34/9	White...	32/3
" " " "	33/3	Refined Metal...	50/
" " " "	33/	Kentledge...	35/6
" " " "	32/9	Cinder...	30/6

WEST COAST HEMATITES

are fairly steady at about 43/ for mixed numbers in usual proportions, and with makers' brands as below:

	No. 1.	No. 2.	No. 3.
Cleator...	45/	44/6	44/
Lonsdale...	48/6	48/	42/6
Workington...	48/6	48/	42/6
Lowther...	48/6	48/	42/6
Distington...	48/6	48/	42/6
Harrington...	48/6	48/	42/6
Solway...	48/6	48/	42/6
Maryport...	48/6	48/	42/6

TIN PLATES.

In London there is no noticeable alteration in this market in the week. The holidays have, of course, interfered to a material extent with business, and it was not until Wednesday that inquiries began to come forward. I still quote IC cokes 12/9 @ 13/ f.o.b. Liverpool. At Liverpool since my last report the Whitsuntide holidays have intervened and retarded business to some extent, but many of the inquiries which were about the previous week have been placed as orders, and, as already noted, these numerous orders for special sizes have been the means of steadying prices a little, so that there is no further talk of lower prices now. Not only have prices been somewhat steadied, but trifling advances have been paid in some instances. Whit-Monday was, of course, a close holiday, and Whit-Tuesday was almost a holiday, so far as business was concerned, but there were a few inquiries sent out on that day and these increased a little on the following days. There seems still to be a better disposition on the part of buyers to place orders, and many are inclined to secure their requirements over the next few months, at least up to August and September. The greater steadiness in prices was perceptible and felt at the close of the week and this better tone has been maintained. The projected stoppage of many tin-plate works in South Wales has had a good effect up to now. Also the orders placed recently have filled some order books for a time, and therefore there are not so many ready sellers anxiously on the lookout for orders. The inquiries this week have run pretty much on steel tin plates, with

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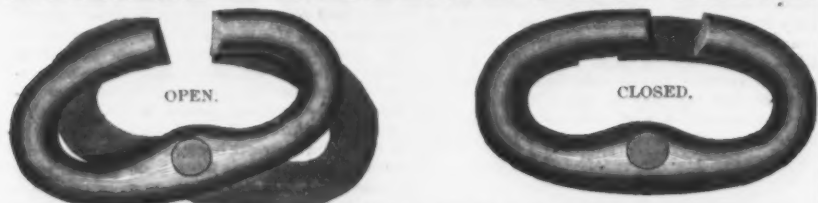
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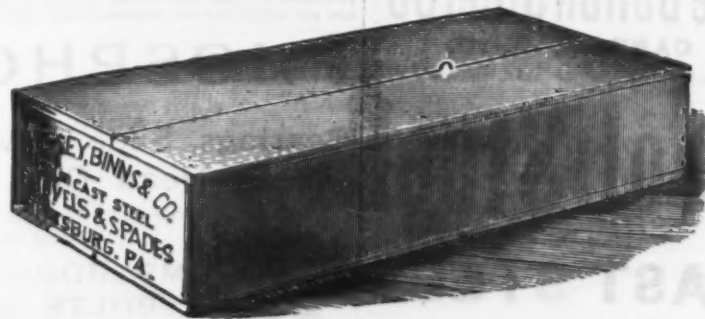
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some few for coke and charcoal tin plates, and, as usual, the second steels (Bessemer) have come in for their usual good share of attention, with Siemens steels in coke grades following closely on those. There are not, perhaps, so many inquiries for cokes and charcoals as there were last week, though the slight improvement in prices was in cokes and Bessemer, the orders for which were fixed up this week. Where 13/16 IC was the utmost offered previously for some ordinary and good coke tins, 13 1/2 @ 13/3 IC has since been freely given, and in the case of Bessemer 13/6 @ 13/9 have been paid where only previously these figures were difficult to secure and could not be obtained for some brands. Leading brands of coke tins are still 13/6 @ 14/10 IC. Wasters are without much change in prices, though the demand for these seems a bit quieter; 12/3 @ 12/9 is about the general quotation, but 12/6 is mostly paid. The prices offered for charcoal tin plates are, as usual, low, viz., 13/6 @ 17/6 IC. Though the orders for terns have come in pretty regularly lately, prices are difficult to move in an upward direction. In fact, buyers will not pay much, if any, advance. This is explained by the fact that with the very low prices that have been ruling for tin plates makers turned their attention more to tern plates, for which fair prices were paid them. But now these have been overdone again, and, like tin plates, do not command better figures, even during the best season.

Sale of an Historic Estate.

We find the following interesting communication in the Baltimore Sun:

On the 26th of May Clement Brooke Grubb repurchased the old Mount Hope Furnace property in Lancaster County, Pa., for the sum of \$300,000 cash. This is one of the finest old iron properties in this country, embracing 2500 acres of land, with a fine farm, and the mansion, although built by Henry Bates Grubb nearly 100 years ago, is one of the most elegant in the State, and is really of modern style, having an immense hall and ceilings 15 feet high throughout. It is situated on an eminence which affords a front view of almost unprecedented beauty and grandeur, extending to and over the city of Lancaster, which city is 15 miles distant, and it is flanked on the east by a beautiful and extensive terraced lawn and garden, making it in all one of the most lovely summer residences possible to conceive. The connection of this estate with the great Cornwall ore mines, in which it has a perpetual right for a full supply of ore, is what gives it its great commercial value, and the desire to again possess the old homestead where he was born, and to regain that ore right which was conveyed by him to his brother, A. Bates Grubb, more than 30 years ago, induced Mr. Grubb to make the purchase.

Mr. Grubb is now, by inheritance, the patriarchal ironmaster of the United States, being the oldest member of the oldest iron family in this country. His great great-grandfather, Peter Grubb, came from Wales, near Cornwall, to this country in 1679, and made large purchases of land from the Indians in what are now Lebanon and Lancaster counties, and subsequently had the titles confirmed by William Penn, and upon one of these tracts he found an immense deposit of iron, which he named Cornwall, and which mine is still the wonder and admiration of all who visit it. Mr. Isaac Lowthian Bell, M. P., and the greatest ironmaster in England, and whose opinion is considered authority throughout the world, told me when he was in this country in 1876 that he had visited most of the great ironmines in the world, including those of Spain, Algeria, the Continent of Europe, England, Scotland and Wales, and many in this country, including those of Alabama and the Iron Mountain of Missouri, and then said: "But Cornwall bears the palm as the greatest iron mountain in the world."

From geological investigation, aided by tests made with the diamond drill, it has been pretty well demonstrated that Cornwall can produce 500,000 tons of ore per year for 300 years to come. The original Cornwall Furnace was built by Cirtus Grubb in 1725, who operated it for many years. Peter Grubb, the second, built Mt. Hope Furnace, the subject of this sketch, in 1784. The Cornwall ore mines are now owned and worked by the families of the Grubbs and Colemans, as tenants in common, under the head of the Cornwall Ore Bank Company.

Of late years we have read a great deal in the papers about the superior facilities of the South for making cheap iron, and, while it must be admitted that there are some admirable locations in Alabama and some other Southern States, their advantages have been highly colored and immensely exaggerated, and a very great majority of them are running now at a loss. The proprietors of Cornwall—the Grubbs and the Colemans—can make and deliver to our Eastern markets good iron at a less cost than all others in this country, and their mine, which has been producing ore for 160 years, will be productive at the end of another period of 160 years, when many of the Southern furnaces that have been breaking the markets as well as themselves with their cheap iron will have decayed and passed into history.

A Ratchet Drill Patent.—The suit of Flavius J. Underwood against Andrew Warren and Perrin G. March was decided in St. Louis last week by Judge Treat in the dismissal of the bill for insufficiency of cause for action. Underwood is a resident of Springfield, Mo., and on September 20, 1877, he bought from Louis Beland, a resident of North Springfield, a patent on a clamp for holding a ratchet drill for drilling steel rails. In company with Warren and March he entered into the manufacture of the drills, and July 9, 1878, he himself invented an improvement which he patented and assigned to his partners third interests. In the settlement of the partnership relations the parties transferred and retransferred their rights to the several inventions until they failed to sufficiently understand who was the owner of what. Warren and March went on manufacturing the patented clamps, and

Underwood brought suit to restrain them. They denied as positively as he had affirmed that they had infringed on his rights, and claimed his own patent was invalid for lack of novelty. It was on the lack of novelty of the invention that the suit was decided, though this was made a subordinate matter in the decision.

Preserving Processes for Timber.

Mr. John Bogart, secretary of the American Society of Civil Engineers, has, for the convenience of members who desire to discuss the report of a special committee on the preservation of timber, at the coming annual convention, printed the following brief summary of its contents: The experience in the United States is given in five tables, comprising the results more or less conclusive of 142 authenticated trials or experiments. In each case these are referred to at more or less length in the text, sufficiently to give the reasons for success or failure, and the lesson taught. The five heads corresponding to the tables are: 1. Kyanizing, or use of corrosive sublimate. 2. Burnettizing, or use of chloride of zinc. 3. Creosoting, or use of creosote oil. 4. Boucherie, or use of sulphate of copper. 5. Miscellaneous, or use of various substances. Of the first, kyanizing, it is stated that an absorption of 4 or 5 pounds of corrosive sublimate per 1000 feet, b. m., is considered sufficient, and it would now cost about \$6 per 1000 feet, b. m. It is not recommended except in situations where the air can circulate freely about the wood, as in bridges and trestles, but in very damp locations (as for ties when in wet soil and pavements) its success is doubtful. Its cost when first used led to cheating, which for a time brought discredit upon it. Burnettizing the committee do not consider the best adapted to use where the timber is exposed to the washing action of water (as this removes the preservative); but, on account of its cheapness, it is probably to be preferred at the present time to any other process for the preservation of railroad ties. The Well house, Thilmann and other modifications of the process aim at making the chloride insoluble, but are yet on trial. This process has been largely and successfully introduced in Germany. Experience shows the life of soft wood ties to be doubled and trebled by its use. Its cost in this country is about \$5 per 1000 feet, b. m., or 20 to 25 cents per tie, and for the latter purpose the committee particularly recommend it.

The work must be well done; but some of the failures were from doing it too well—that is, from using solutions of too great strength, thus making the timber brittle. A solution of 2 per cent. by weight of chloride of zinc in water is recommended. Creosoting, or the injection of timber with hot creosote oil in a cylinder under pressure, is considered to be the very best process which has been fully tested where expense is not considered. It is as yet the only one known which is sure to prevent the destructive attacks of the teredo or other marine animals, and to give absolute protection against decay in very wet situations. It is a somewhat expensive process, requiring for protection against the teredo from 10 to 20 pounds per cubic foot of timber, and costing from \$12 to \$20 per 1000 feet, b. m. For resisting decay alone a cost of \$10 to \$14 is sufficient. The boucherie process, in which green timber is impregnated with sulphate of copper either by vital suction, hydraulic pressure or a vacuum, when well done, using a solution of 1 pound of sulphate to 100 of water, has proved fairly successful. Under the head of "miscellaneous" are classed 41 experiments with almost as many substances—sulphate and pyrolignite of iron, lime, rosin oil, tar, &c.—but with as yet no commercial success. The general principles laid down are to select the process with reference to the subsequent exposure. Use open-grained porous timber—for that reason, in general the cheaper woods. Extract the sap and water to make room for the material to be injected, natural seasoning, except for the boucherie process, being very desirable. Steaming takes the place of seasoning. Use enough of the antiseptic to insure a good result, and then let the timber dry before using, as its durability will thus be increased. Do not hasten the work if it is to be well done. Protect ties or timber in the track as far as may be from water by drainage. Contract only with reliable parties of established reputation, under a skilled inspector, who must be in constant attendance when the magnitude of the order warrants. There is at the close a discussion of the question, Will any preserving process pay? This is answered in the affirmative. The chairman of the committee gives a careful estimate in one of the appendices in an actual case in this country; another general estimate is given based on European experience, and three other separate appendices give different methods of examining the question of economy and comparing values. Other appendices (to the number of 20 in all) treat of the general question of destruction and conservation of forests, and give reports of the personal experience of a number of engineers, with methods pursued, apparatus used, &c.

S. A. Ginna, of Plainfield, N. J., and R. A. Donaldson, of Brooklyn, N. Y., are the patentees of a machine for printing metal plates and for fixing durable colored impressions on such plates. The frame of the machine carries a table to which a reciprocating motion is given. On the table is fixed a lithographic stone, which, by the motion of the table, is carried beneath the inking rollers, and also beneath an impression or printing cylinder. To the periphery of this cylinder a sheet of thin cardboard, well-sized and highly glazed, is attached, which receives the impression from the lithographic stone. Over the printing cylinder is a second or pressure cylinder, and the tin plates or other metal plates to be printed are passed between the two cylinders. Several colors may be printed, either by different machines or with the same machine, in which case the stone, inking arrangement and cardboard are first changed. After the plates are printed they are stored and varnished or polished in the usual manner.

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This is a handsome volume of 242 pages, printed on heavy paper, and substantially bound in cloth. It is illustrated by upward of 500 line engravings.

The work is comprised in five general divisions or chapters, bearing the following titles: (1) Definitions

Pattern Problems.

161

G H K, of Fig. 426, is presented one of the sets of conditions which necessitate a change of profile, in either the horizontal or raking molding, in order to accomplish a miter joint at the point indicated by I H in the plan. In other words, the conditions are such that with a given profile, as shown by A' in the raking molding, the horizontal molding forming the return will require to be modified, as shown by the profile A'', in order to form a miter upon the line I H in the plan; or, if A' is established, A' will have to be constructed to correspond with A''. The reason for this is quite obvious. The distance across the raking molding at right angles to its lines is greater than the corresponding distance across the return molding at right angles to its lines; therefore the projection in the cornice, as shown by the profile A'', must be distributed through a smaller space than is shown in the profile A'. In this problem we assume that the pitch of the raking cornice B C is established and that the profile A is given, and from these parts it is required to develop the modified profile. We have the choice of placing the normal profile in the horizontal return and making the raking profile correspond with it, or of placing the normal profile in the raking molding and making the profile of the horizontal molding agree with it. Although the principle upon which these operations is performed is identical in both, the demonstration will be made clearer if each is fully illustrated independent of the other. In this problem and the following one, therefore, we show the several steps necessary to take in modifying the profile, and in cutting the several patterns required to form the structure indicated by the elevation and plan. First we will assume that the normal profile occurs in the raking cornice, and that the horizontal profile is to be modified to suit it. We then proceed as follows: Draw a representation of the normal profile in the raking cornice, as shown by A', placing it to correspond to the lines of the cornice, as shown. Draw another profile corresponding to it in all parts, directly above or below the foot of the raking cornice, in line with the face of the new profile to be constructed, placing this profile A so that it shall correspond with the lines of the horizontal cornice. Divide the profiles A and A' into the same number of parts, and through the points thus obtained draw lines, those from A' being parallel to the lines of the raking cornice, and those from A intersecting them vertically. Through these points of intersection trace a line, which gives the modified profile, as shown by A''. Then A'' is the profile of the horizontal return, indicated by G H I F in the plan. It is also the elevation of the miter line I H of the plan for the several patterns involved. We therefore proceed as follows: At any convenient point at right angles to the lines of the raking cornice lay off the stretchout M N of the profile A', through the points in which draw measuring lines in the usual manner. Place the T-square at right angles to the lines of the raking cornice, and,

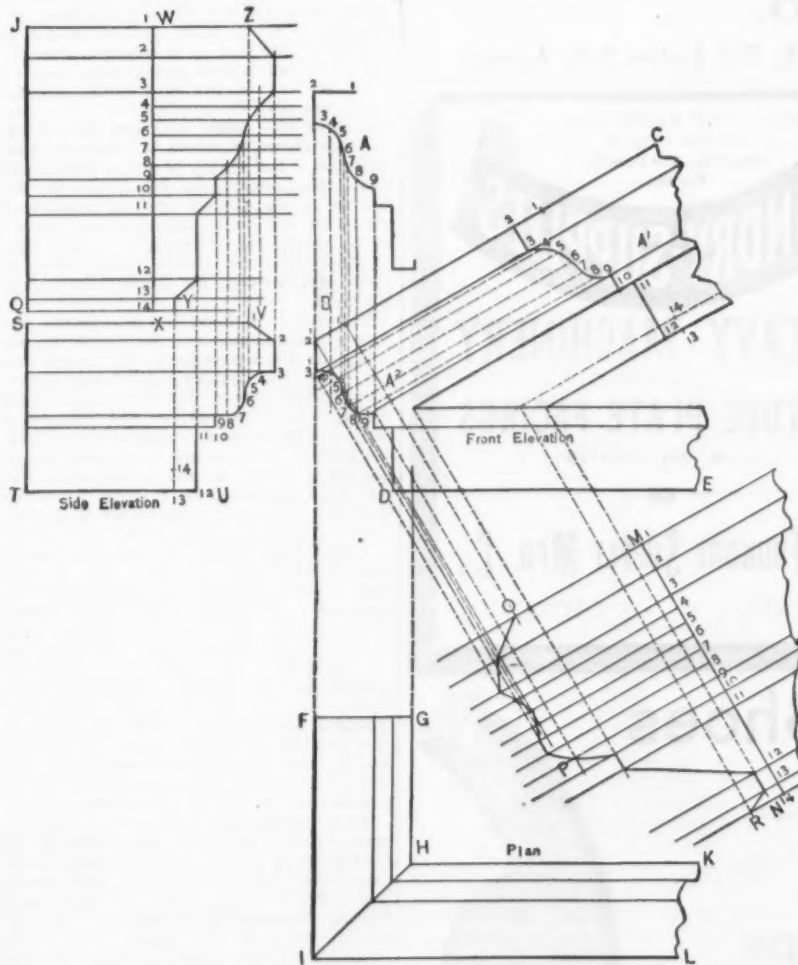


Fig. 426.—To Ascertain the Profile of a Horizontal Molding Adapted to Miter with a Given Inclined Molding at Right Angles in Plan, and the Several Miter Patterns Involved.

comments it has called forth, prove that it fully meets the want it was intended to supply.

and Technicalities; (2) Drawing Tools and Materials; (3) Geometrical Problems; (4) The Art and Science of Pattern Cutting; and (5) Pattern Problems. These titles sufficiently indicate the subject matter of the several parts.

The specimen page here shown is from the last division of the book, entitled "Pattern Problems," and which embraces more than one-half of the entire work. It shows the manner in which practical questions are treated. The list of problems demonstrated is very extensive, and embraces almost everything of common occurrence in the sheet-metal trades, with enough of the exceptional to show methods adapted to special requirements. This chapter, in short, is a ready reference book for all who have pattern cutting to do. Each demonstration is complete in itself. A carefully prepared index facilitates reference. The work has been prepared for sheet-metal workers in general, and not for any one class in particular. The tinner will find in it what he requires, without the necessity of studying the cornice problems. The cornice maker will find in it everything, from a simple miter to the most complex problems, so arranged as to meet his requirements without the necessity of going through portions in which he is not interested. The general student will find the entire subject presented in such a manner as will facilitate systematic study. The rapidity with which each edition has been exhausted, and the universally favorable

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83 Reade Street, New York.

(Concluded from page 1.)

kept under constant pressure of 450 pounds per square inch. Attached to these rams are two wrought-iron bars $2\frac{1}{2}$ inches square. These go through the bed-plate and roll standards to the under side of the top roll carriage. The roll is moved by hydraulic pressure by means of a cylinder 9 inches in diameter by 24-inch stroke placed horizontally on the top of one standard, as shown in Figs. 1 and 4. This works two screws 10 inches in diameter over the threads, which are 2-inch pitch. A steel pinion is keyed on each screw, and geared into them are two quadrants, one on each standard. These are connected together by a wrought-iron connecting-rod passing from standard to standard, as shown in Fig. 1. The ingot has to pass four times through each of the first and second grooves. The top roll is raised for the first pass and lowered for the second; the bar is then turned on edge, and the top roll raised for the third pass, and for the fourth the roll is again lowered. The bar passes twice through each of the four succeeding grooves, the top roll closing on the bottom in each case for the second pass. The speed varies from 18 to 24 revolutions per minute.

Fig. 8 is a general plan of the whole mill. The engines are of the horizontal type made for work of this description by Messrs. Galloway & Sons, Manchester. They are geared

bering that at least in this case they have proved inferior to those of cast iron, and seem to require protection against fire quite as much as the cheaper kind. The simplest protection, as we may again remind our younger readers, both for cast and wrought columns, consists of a coat of plaster, put on wire cloth wrapped around the columns. If the wire cloth is held out a little from the iron by wooden furrings or by corrugations in the cloth, so as to give the plaster a good key everywhere, a perfect protection is secured at a very small expense, and we should not be sorry to have the law require such protection for all columns used in building.

A Safeguard Against Collisions With Icebergs.

The danger to ocean steamers from collisions, during fogs, with icebergs has induced Prof. Alexander Graham Bell, the famous inventor of the telephone, to call the attention of the public, through the columns of *Science*, to the method proposed by Mr. Frank Della Torre, of Baltimore. Professor Bell speaks of the subject in the following language:

Mr. Della Torre's experiments indicate the possibility of obtaining an echo from an iceberg when in dangerous proximity to a ship. Mr. Della Torre believes that even an object offering so small a surface as a floating wreck may in this way be detected

ments on the Patuxent River a curious rumbling effect, like the rolling of thunder, was often observed, which continued for some seconds. A similar sound was also noticed, as an echo from a well-wooded shore, but the effect alluded to above could not have been due in any way to the land, as the sound commenced immediately upon the firing of the gun, whereas the shore was distant at least 1 mile or $1\frac{1}{2}$ miles. The sound was probably due to the presence of ripples on the surface of the water, as the effect was much less marked when the surface was smooth. Such a sound might prove a disturbing element of importance in a rough sea, but would hardly be sufficient to prevent the detection of an echo from a large iceberg. Had shots been fired periodically from the bow of the City of Berlin, it can hardly be doubted that the presence of an obstacle ahead would have been discovered in time to prevent the collision that actually occurred.

Isochromatic Photography.

As long ago as 1873 Dr. Vogel, an eminent German photographic chemist, announced that by staining the photographic film with various dyes its sensitiveness to certain colors was decidedly increased, and, though the announcement was not directly of commercial value, it suggested a line of experimental investigation which, in his hands, and notably in the hands of another

lithograph of a lady wearing a bright scarlet hat with purple feather, a yellow-brown cape, and a dark-blue dress. Two pictures of this subject were shown side by side, one taken by the ordinary photographic method and the other by the Ives "isochromatic" process. In the first there are scarcely any visible differences in the dark shades of the hat and feather, and cape and dress; in the other these are all perfectly distinguishable by marked differences of shade, the purple feather being much darker than the scarlet hat, and the cape distinctly lighter than the dress, showing in the most convincing manner the capacity of the Ives process to bring out the full value of all the colors which photograph too dark or too light by the ordinary methods. From this advanced standpoint it will not be difficult to understand that by indirect methods photographs in colors may be obtained. When the photographer is armed with plates which are equally sensitive to all colors, especially to red and yellow, which have hitherto given the greatest trouble, he can readily, by the use of suitable color screens to cut out certain colors successively, produce from any colored object a set of three negatives, in one of which the shadows will represent the blue of the original, in another the yellow, and in another the red. It will only be necessary now to make from these negatives prints in transparent pigments, blue, yellow and red, and

satisfactory. An attempt to substitute sulphate of manganese for nitrate of lead in this battery did not answer the purpose, as the peroxide of manganese separated itself, not in a continuous layer, but in loose scales.

Petroleum for Boiler Scale.

A writer in *Cotton, Wool and Iron* says that several years ago he was engaged to take charge of a steam plant in what is known as the alkali region. The water was so impregnated with minerals that it was next to impossible to keep boilers in passable condition, and many were ruined before they had been in service two years. This plant had been in operation only three months, yet the deposit in the boiler was very heavy, so far as could be judged. All kinds of scale exterminators were used, but to no purpose. At length in desperation, while cleaning boilers, kerosene oil was taken, and the scale thoroughly saturated with it. The boilers were allowed to stand until the scale had absorbed all the oil before filling with water. After two weeks' run the boilers were emptied for cleaning. Upon taking off the hand-hole plates it was found that the bottom of the boilers was covered with detached scale. The tubes looked as though they were just recovering from an attack of small-pox, while the scale which still adhered to them could easily be removed. The heads and other spots where the deposit had not been removed were again wetted with oil. The

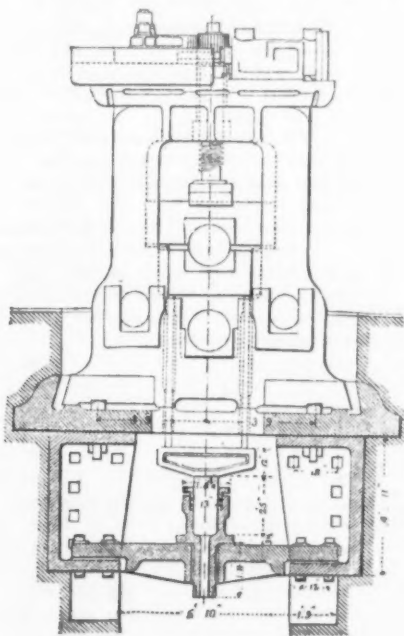


Fig. 4.—Side Elevation.

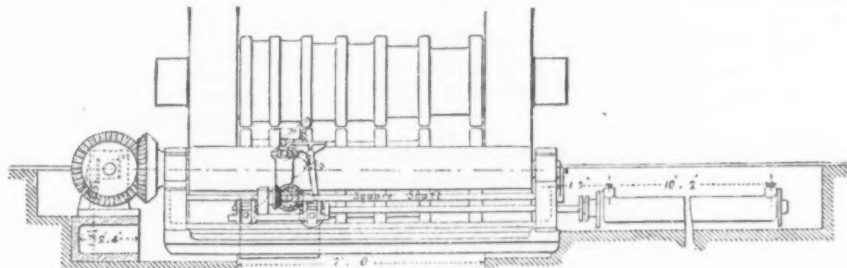


Fig. 6.—End View of Feed Tables.

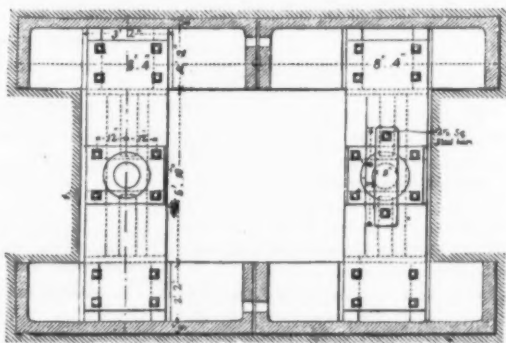


Fig. 7.—Bed-Plate of Roll Standard.

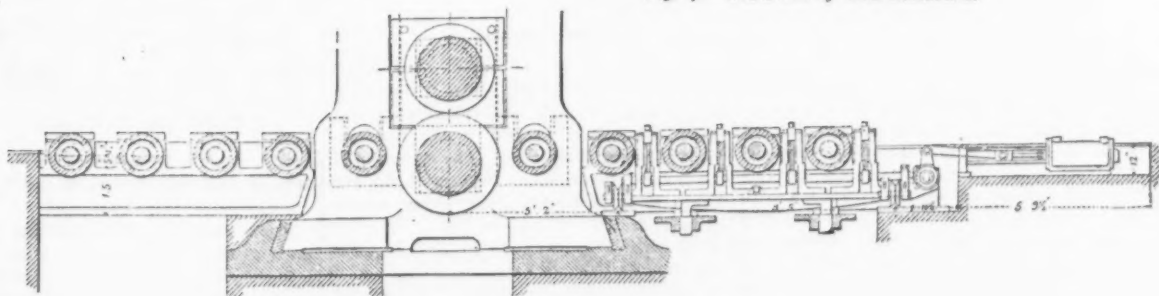


Fig. 5.—Vertical Section of Feed Tables.

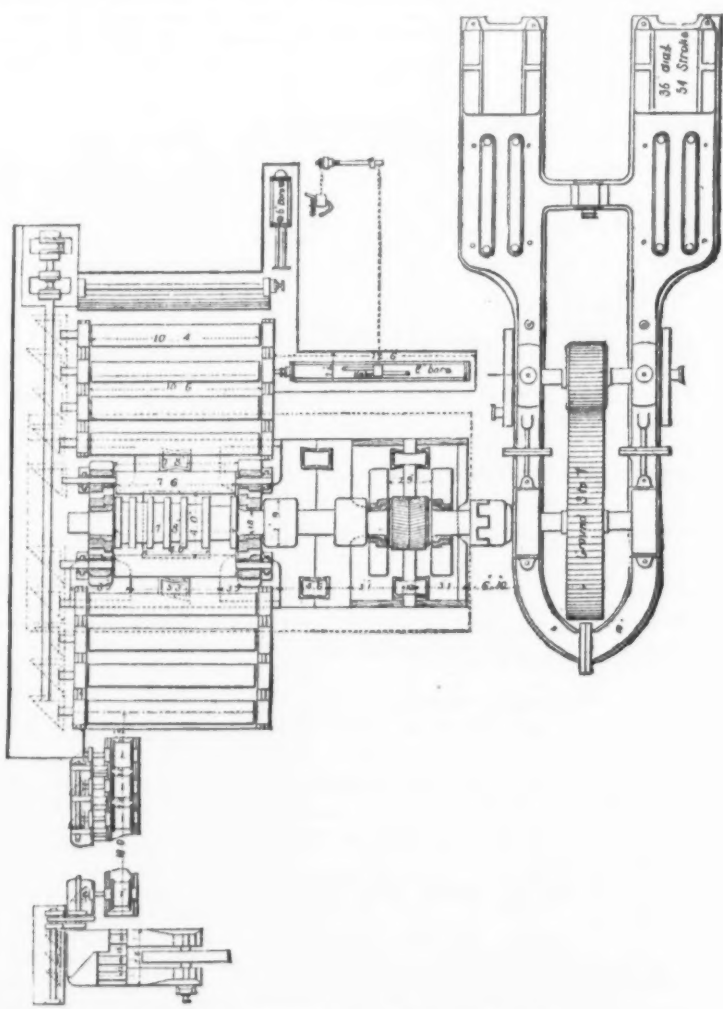


Fig. 8.—General Plan of Blooming Mill.

BLOOMING MILL WITH BALANCED TOP ROLL AT THE EBBW VALE STEEL WORKS.

3 to 1, and have hydraulic reversing gear with a cylinder 5 inches in diameter by 12½-inch stroke. The engines are connected to the rolls by means of coupling boxes, helical teeth, pinions and breaking spindles.

SCIENTIFIC AND TECHNICAL.

The Resistance of Cast and Wrought Iron Columns to Fire.

Some experiments, according to the *Builder*, have recently been made in Munich, by Professor Bauschinger, to determine the comparative security of exposed cast and wrought iron columns in case of fire. It is well known to most architects that cast-iron columns are liable to warp and crack when subjected to the heat of a conflagration, particularly if cold water is thrown upon them while they are hot, and precautions against this are now very commonly employed where iron columns are used in building. In New York the law requires that all cast-iron columns which sustain walls shall have an independent exterior casing, to protect them both from the heat of a fire and from water, and a similar regulation, extended to all cast-iron columns used in building, has lately been adopted in Berlin. Columns of wrought-iron, however, which are, of course, much less brittle than those of cast-iron, are allowed to be used there without protection, and Professor Bauschinger's tests seem to have been made primarily with the intention of obtaining information as to the behavior, under the conditions which exist in a building on fire, of these columns, which, though often used by engineers for supports of bridges, are seldom employed in strictly architectural work. For the purpose of experiment, unprotected columns, both of cast and wrought iron, were loaded with the average weights which they are expected to sustain in actual buildings, and were then heated first to a temperature of 300°, then to 600°, and finally to a red heat, and were then suddenly cooled by a jet of water from a hose. Under these circumstances the cast-iron columns warped and cracked, as was expected, but did not yield entirely, while the wrought-iron columns began to bend before they were heated to redness, and were so violently distorted when cold water was thrown upon them that they could no longer support their load. No doubt the form of the wrought-iron column would determine to some extent its liability to bend when heated, but it is worth remem-

during a fog in time to prevent collision. However this may be, it is certain that his method is worthy of a careful trial at sea, and that preliminary experiments recently made in the presence of Professor Rowland, of Johns Hopkins University, and the present writer, have demonstrated the feasibility of producing well-marked echoes from sailing vessels and steamboats at considerable distances away. These experiments were made on the River Patuxent, near the head of Chesapeake Bay, at a point about 7 miles from the city of Baltimore. The party proceeded down the river in a steam launch to the selected place, where the distance from shore to shore appeared to be about 3 miles. The launch was kept so far from land as to prevent the possibility of mistaking an echo from the shore for one produced by a passing vessel. The apparatus employed consisted of a musket to the muzzle of which a speaking trumpet had been attached. This gun was aimed at passing vessels, while blank cartridges were fired. After a longer or shorter time, according to the distance of the vessel, an echo was returned. The ordinary river steamboats, and schooners with large sails returned perfectly distinct echoes, even when apparently about a mile distant. At shorter distances the effects were, of course, still more striking. In order to test the effects under the most disadvantageous circumstances, blank cartridges were fired in the direction of an approaching tugboat. The surface presented was, of course, much smaller than if the boat had presented its broadside to the launch. As the boat approached bow on, it corresponded to a target somewhere about 6 feet square, presenting a convex surface to the impinging sound wave. Even in this case a feeble echo was perceived when the boat was at a considerable distance (estimated to be nearly ¼ mile). That any echo should have been perceived at all under such circumstances was a surprise. The sound was heard only by the closest attention, but in the case of larger vessels the effects were very distinct and striking. Experiments were made which demonstrated the fact that the speaking trumpet attached to the gun was of material assistance in giving direction to the sound impulse, and in intensifying the audible effect. Mr. Della Torre claims that a steam whistle or siren, combined with a projecting apparatus like a speaking trumpet, will prove as efficient as the gun. During the experi-

experimentalist about to be named, has apparently solved the problem to practical perfection. Some six years later, says the *Bulletin of the Novelties Exhibition*, Mr. Fred. E. Ives, an American photographer, taking up this interesting line of research, succeeded in finding a substance which, when the plates were treated with it, rendered them remarkably sensitive not only to all shades of red, but also to orange, yellow and green. This substance was chlorophyll, the green coloring principle of the leaves of plants. By placing in front of his lens a color screen consisting of a small tank containing a weak solution of bichromate of potassium, to cut off part of the blue and violet light, Mr. Ives obtained with his chlorophyll plates the first photographs in which all colors were reproduced in the true proportions of their brightness, as they affect the eye. Mr. Ives had undoubtedly made a valuable discovery, but he labored under the disadvantage of being comparatively unknown. When, therefore, in 1879 he published an account of his method of "isochromatic" photography, it was so great a step in advance of anything then known that his claims were regarded as too improbable to merit respectful consideration, and, as he himself says, he "could not persuade any one to give the method a fair trial." The announcement, however, by Dr. Vogel, about a year ago, that he had, after many years of persistent investigation, succeeded in discovering a successful process of this character, aroused the greatest interest in the scientific world, and accomplished the unlooked-for result of directing attention to the long-forgotten procedure of Mr. Ives, which was found to be not only a perfectly practical one, but also to give results decidedly better than it was possible to attain by that of Vogel. The result of the widespread discussion of the subject which has been going on in the columns of the photographic journals has been that the tardy justice of a full acknowledgment of his important service to photographic chemistry has been accorded to a meritorious investigator.

At a recent meeting of the Franklin Institute Mr. Ives exhibited some remarkable specimens of his process, consisting of photographs of landscapes and of colored pictures, in which every detail of the natural shading was faithfully reproduced. One of these pictures was quite remarkable. The subject selected was a highly-colored chromo-

to superimpose these suitably upon a white surface, to obtain a picture which will represent not only the lights and shadows of the object in their true proportions, but also the colors of the original. This has actually been accomplished, and from the widespread interest which the whole subject is now attracting throughout the photographic world it is not hazardous too much to predict that we are on the eve of some interesting discoveries in this field of experimental research.

A New Secondary Battery.

At a recent meeting of the Berlin Physical Society Dr. Kalischer described a new secondary battery intended to overcome the disadvantage of the usual accumulators, namely, that the sheet of lead used as anode was very soon destroyed. This object he is said to have attained by adopting a very concentrated solution of nitrate of lead as electrolyte and iron as anode. The iron, on being immersed in the solution of lead, became passive and resisted every corroding effect of the fluid; in other respects the peroxide of lead on the electric charge became deposited at the anode as a very firm coherent mass, enveloping and protecting the iron on all sides. The charge was continued until the greater part of the nitrate of lead was decomposed, a condition which was marked by the occurrence of a greater development of gas at the anode. At the beginning of the charge all development of gas must be avoided, as otherwise the peroxide of lead, or, more correctly, the hydrate of peroxide of lead, became covered with bubbles. As cathode a sheet of lead was used, but it was attended by two disadvantages. In the first place the lead, during the charge, separated itself at the cathode into long crystal threads which soon passed through the fluid and produced short circuiting. In the second place the nitric acid, which remained in the fluid after the separation of the lead, acted very powerfully on the sheet of lead. Both disadvantages Dr. Kalischer avoided by amalgamating the cathode. This accumulator of iron, concentrated solution of nitrate of lead and amalgamated lead yielded, after the electric charge, which could be carried out without any special preparations, a current of about 2 volts; after about six hours' discharge, however, the electro-motive force sank to 1.7 volts, but, on the battery being left to itself for 24 hours, it increased a little. According to the measurements hitherto taken, the functions of this accumulator were

next run was of four weeks' duration—just twice those before—and then the boilers were clean and only emptied once in six weeks. After considering the matter the plant was so arranged as to be able to inject the oil in small quantities while the boilers were in use, and after that about 1 quart per week was given to each boiler that was 5 feet diameter by 18 feet long. Kerosene must be used with judgment, for too much will undoubtedly ruin a boiler. The amount needed to do the work is very little. It stated that the above happened in 1875, and that the same battery is in use to day and in good condition, and that the average life of a boiler in that region heretofore has been about five years.

The Manufacture of Oxygen.

MM. Brin, of Passy, are producing oxygen on rather a large scale by the barium-oxide process. They have two large retort furnaces regularly going, filled with retorts of 9.2 feet length and 6.2 inches in diameter. In these retorts they calcine barium oxide, passing over it a stream of air which has first passed through quicklime to free it of carbonic acid. During this calcination the heat does not exceed about 500° C., at which temperature the barium oxide absorbs oxygen, becoming peroxidized. The nitrogen is drawn off and passed into gasholders, to be used for making ammonia, &c. When the barium oxide has absorbed as much oxygen as it can, the heat is raised to about 800° C., at which temperature the peroxide is decomposed, giving up again the absorbed oxygen, which is drawn off and pumped into a gasholder. MM. Brin make use of the oxygen so collected in many ways, one being the application of it to the purification of water. Filtered water is placed in a cylinder and saturated with oxygen gas at 300 pounds pressure to the inch. All organic matter is destroyed and perfectly pure water results.

The revival of American shipping was discussed by the New York Board of Trade and Transportation last week, and a resolution adopted that "30 cents per ton be granted by Government for every 1000 miles sailed by vessels, sail or steam, built and owned in the United States and engaged in foreign commerce, for 10 years, after which the payment to be reduced to 10 per cent. annually," as a well-deserved method of reviving the decaying and almost lost shipping interest of the country.

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AND
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New York, Thursday, June 18, 1895.

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Substitution of Steel for Iron.

We quoted, some time since, very significant figures by Mr. G. W. Cope, secretary of the American Iron and Steel Association, bearing upon statistics of the substitution of steel for iron for other purposes than rails in this country. It was believed to be a subject worthy of closer study to endeavor to ascertain to what extent this substitution was going on in other leading producing countries, with the object of comparing the movement there with that going on here. Such an investigation is not without its difficulties, growing chiefly out of the fact that there are a good many complications. Thus in some countries no distinction whatever is made in reporting statistics between open-hearth and Bessemer metal. In the majority of cases, too, the sale of ingots and blooms in the open market makes it impossible to trace the forms into which they have been worked. This was notably the case a few years ago, when a large quantity was imported into this country to be rolled into rails. In a number of instances rough approximations only are possible. From the data available we have compiled the following table, which shows the quantity of steel produced in Great Britain, Germany, France, Belgium and in this country for purposes other than rails during the years 1882, 1883 and 1884, the unit throughout being the net ton of 2000 pounds.

Production of Steel Other Than Rails.

1882 1883 1884

Great Britain.....644,000 728,000 842,000

Germany.....445,291 485,602 474,502

Belgium.....45,710 42,066 41,672

France.....105,600 118,278 110,000

United States.....212,369 395,143 375,585

Total.....1,432,970 1,574,129 1,844,419

For purposes of comparison we submit the following table of the production of finished iron, or rolled wrought iron in all forms, including iron rails, the unit again being the net ton throughout:

Production of Wrought Iron.

1882 1883 1884

Great Britain.....3,192,418 3,038,165 2,506,140

Germany.....1,619,042 1,596,868 1,543,000

Belgium.....554,497 536,922 529,450

France.....1,182,469 1,078,797 1,047,000

United States.....2,469,831 2,848,874 1,957,307

Total.....8,002,247 8,619,597 7,576,797

The most striking fact revealed by a comparison of these tables is that the output of steel for purposes other than rails has steadily grown in the leading producing countries named, while, on the other hand, the make of rolled wrought iron has as steadily declined. Out of a total of finished iron and steel in 1882 of 10,515,147 tons, 13.8 per cent. was steel. In 1884 this percentage had risen to 19.6 per cent. in a total product of 9,421,216 tons. In these tables no crucible or puddled steel is included, nor is any Bessemer or open-hearth steel counted which has gone into the manufacture of rails.

It is curious to note in what different directions the substitution of steel for iron is proceeding in different countries. In England the industry most severely attacked of late is the manufacture of ship plates; in Germany steel has practically crowded iron out of the great wire trade of that country; in Belgium and France the manufacture of wrought iron has held its own remarkably well, comparatively speaking; in this country, as we have already shown, the principal lines of attack have been plates, bars, rods and nails.

Before touching upon the accumulating evidence that the past has only been a prelude to the future, so far as our own iron mills are concerned, it may be of some interest to trace how the diversion of steel into other channels than rails has grown during the past few years, and, as before, we use the net ton.

Total Production of Bessemer and Open-Hearth Steel.

1882 1883 1884

Great Britain.....2,392,807 2,249,946 1,973,038

Germany.....1,184,431 1,168,772 1,383,010

Belgium.....196,770 197,797 198,143

France.....477,154 500,465 535,561

United States.....1,856,922 1,788,906 1,672,212

Total.....6,078,134 5,954,886 5,761,964

It will be noted, therefore, that there has been quite a steady decline during the past three years in the quantities of Bessemer and open-hearth ingots produced in the countries named. In the face of a declining consumption throughout the world the percentage of finished steel other than rails has grown from 23.9 per cent. in 1882 to 26.4 per cent. in 1883, and 32 per cent. in 1884. Nor do these figures quite cover the magnitude of the movement, since the amounts given in our first table in some cases represent the quantities of finished products, not the weight of the ingots used in producing them. It is, therefore, certainly within the mark when we say that now less than two-thirds of the Bessemer and open-hearth steel made in the world is used in the manufacture of rails, while three years ago it was nearly three-quarters. Large as has been this growth, it is, we believe, within the bounds of a conservative statement to claim that it will continue at the same pace, and is even likely to develop with accelerated speed. The preparations in this country certainly point in that direction. There is little doubt that the quantity of steel required for the manufacture of rails will be far behind that of last year. On the other hand, a number of the old rail mills are making large quantities of steel for nail shebs, wire billets and structural, merchant and agricultural shapes and castings. The principal increase will be, however, in the substitution of steel for iron for rails. Some of the plants now running, like the Riverside Works, at Wheeling, and the Bellaire plant, did not contribute very much to the total make of last year, having been only just started. The Benwood plant, at Wheeling, will add its quota this year. In addition to these the Junction Iron Company and the Laughlin Nail Company are jointly putting up two 5-ton converters, which are expected to run during the last three months of this year. The Schoenberg, at Pittsburgh, and the Pottstown Iron Company, at Pottstown, are preparing to become makers of Bessemer steel. The Western Nail Company and the Crown Point Company have begun the erection of Clapp-Griffiths' plant, and the first works they equipped, that of Oliver Brothers & Phillips, is running. As for the projects still in embryo, their number is very large.

So far as the East is concerned, the activity is, on the whole, less striking, chiefly because the difference in the price of iron and steel is not so largely in favor of the latter. Taking the question of nails, we are informed that steel slabs cost, delivered at works, about \$30, while good puddled iron costs \$26. Taking into account differences in waste and in grinding of knives, it is estimated that the steel nails are dearer by \$2.50 to \$3 per ton. The total quantity of rolled iron required to produce upward of 7,500,000 kegs of nails was in 1884 nearly 380,000 net tons. The estimated capacity of the Riverside, Bellaire, Belmont, Western Nail Company and Junction plants, when in full operation, is about 300,000 tons. It would appear, therefore, that for the present there is not much more room for additional works for this specialty, even if steel should supplant iron entirely, for which there is no immediate prospect, so far as the East is concerned.

Very little has been done in this country in the utilization of slack coal except in the way of its direct burning in furnaces. Various attempts have been made to manufacture this into blocks for boiler firing, domestic use, &c., but, while they may have been experimentally successful, they have not made much headway commercially, except in one case of a works on the Hudson River, which is working up anthracite coal dust, a problem that differs in some impor-

tant features from that of making patent fuel from bituminous coal. In Europe, however, a large business is done in the manufacturing of waste coal into briquettes. A recent estimate by Dr. Gurli, of Bonn, gives the production of briquettes during 1884 as follows:

	Tons.
France.....	1,400,000
Belgium.....	800,000
Austria.....	250,000
Italy.....	150,000
Spain.....	100,000
Germany.....	100,000
Russia.....	100,000
Sweden.....	100,000

While this is certainly a very much larger quantity than was thus manufactured 10 years ago, it is still only an exceedingly small percentage—about 1 per cent. of the total aggregate output of coal in the countries named, which is near 290,000,000 of tons. It will be observed how small a part briquette manufacture plays in such coal-producing countries as England and Germany. With our cheap bituminous coal, and large and accessible coal area, the future of briquette manufacture in this country does not appear to be one of very great promise.

The Erie Canal and the St. Lawrence Route.

The business men of Montreal are clamorous in their appeals to the Dominion Government for a permanent abolition of tolls on the Welland Canal, otherwise known as the "St. Lawrence route." The Board of Trade, Corn Exchange Association and merchants generally unite in a petition to this effect. One of these documents addressed to the Governor General represents that, owing to the reimposition of tolls and the widespread stagnation in general trade, the business of the petitioners is on the "verge of extinction," and another says "the St. Lawrence route has already lost and must continue to lose its normal share of the grain export trade of this continent unless the exceptional and onerous taxation is ameliorated." A delegation to Ottawa will spare no effort to enforce these views, but the Government will probably hesitate to yield its sanction to a measure like that of imposing an additional burden on the public treasury for the special benefit of a single province. The people at large would defeat the proposition if the question was submitted to them at the polls.

The dilemma is a serious one for Canada and instructive from the standpoint of an impartial observer. In some minds it is more than suspected that the magnificent scheme of public works initiated years ago on the other side of the St. Lawrence River is substantially a failure. Not only is the Dominion embarrassed by an indebtedness disproportionate to the population and its resources, but the advantage sought—the control of the trade of the Northwest—has not been secured. Trade seeks other channels. The fact is largely due to the superior facilities offered by railway as compared with the water routes. It may also be ascribed to the fierce competition of rival routes—the Canadians finding themselves handicapped and overshadowed by the Great Republic in its giant strides across the continent. At one time, and that not long ago, it appeared to the traders of the St. Lawrence that an enlargement of the Welland Canal, just one more effort for commercial supremacy, would tip the beam in their favor. Then, surely, the short route to Europe from the grain fields would be established beyond a doubt, and the "Yankees" would find themselves "out in the cold." But the legislators at Albany declared in favor of no tolls, despite the intrigues of railroad managers. As by the waving of a wand, the fair visions long cherished by our Northern neighbors vanished as into thin air. Although the year was one of almost unexampled business depression, the canal deliveries of grain in the port of New York in 1884 were 37,500,000 bushels, as against 28,000,000 bushels by rail. True, the canal business of the season was less than that of the year before, but the loss of tonnage by the trunk lines of railway during the same period was in a much heavier ratio. Still another season comes round and the cry is that the trade of the St. Lawrence is irretrievably lost unless the Government immediately comes to its relief. Meanwhile, the Erie Canal sends its argosies to tide-water and demonstrates anew the wisdom of its projectors, not so much, however, in the amount of tonnage which it transports as by reason of the wholesome restraints imposed on railroad capacity. The advantages thus resulting may not be expressed in figures, but are none the less real and substantial, and form an element in commercial calculations which the Canadians do not fully appreciate.

The internal improvements of Canada were completed a quarter of a century too late. Canals have had their day, and when the great waterway between the lakes and the Hudson was opened it was of incalculable advantage to the country. It would not now be built, however, and if built it could exercise no such controlling influence upon the course of trade as in its days of greatest usefulness. The Canadian canal system was not built until canals had become in great degree obsolete. They were a mistake of the most costly kind, and one which is not likely to be corrected by the Canada Pacific. The St. Lawrence route is undoubtedly the natural outlet for the Great Lakes; but it is not difficult to see why the trade of the Northwest prefers the more Southern channels to the sea.

Estimates of the Cost of Producing Pig Iron.

A number of persons plainly unqualified to speak on so important a topic have of late overwhelmed a patient public with estimates of the cost of producing pig iron, until the rage has assumed the proportions of an epidemic. There is no industry which suffers so much from guesses as the manufacture of pig iron. The important items entering into expenditure are few, comparatively speaking, and the process of evolving an "estimate" of cost is proceeded with unhesitatingly by a method following in a general way this pattern: Ore in a given locality costs about \$5 per ton, or, say, \$7.50 per ton of iron; coke, \$3, or, using 1½ tons, say \$4; limestone, 75 cents; labor, \$1.50; interest, repairs, &c., \$1; therefore the cost is \$14.75. Those who indulge in guesses on this plan presumably console themselves for the absence of exact data with the fond hope that errors may compensate themselves, or they follow the principle of dealing liberally with the furnace and ending up with the calm reflection that it ought not to cost more than that, anyhow. These are the amateur guessers who have usually no other interest in the matter than to let their light shine. Our readers will recognize the family resemblance between the ideal examples given above and the following "estimates" of the cost of Bessemer pig iron at different points in the West by a Cleveland correspondent of the Pittsburgh Dispatch:

Pittsburgh.

1½ tons ore at \$6.75.....\$10.12

1 3-10 tons coke at \$2.....2.00

¾ ton limestone at \$1......75

Labor.....1.50

Repairs, salaries and incidentals.....1.00

Total cost of pig iron.....\$15.39

Wheeling.

1½ tons ore at \$6.75.....\$10.12

1 3-10 tons coke at \$2.80.....3.60

¾ ton limestone at \$1.30......90

Labor.....1.50

Repairs, salaries and incidentals.....1.00

Total cost.....\$17.11

Youngstown.

1½ tons ore at \$6.25.....\$9.38

1 3-10 tons coke at \$2.75.....3.57

¾ ton limestone at \$1......75

Labor.....1.50

Repairs, incidentals and salaries.....1.00

Total cost.....\$15.85

Cleveland.

1½ tons ore at \$5.50.....\$8.25

1 3-10 tons coke at \$3.25.....4.22

¾ ton limestone at \$1......75

Labor.....1.50

Repairs, salaries and incidentals.....1.00

Total cost.....\$15.54

Chicago.

1½ tons ore at \$5.50.....\$8.25

1 3-10 tons of coke at \$4.25.....5.51

¾ ton limestone at \$1......75

Labor.....1.50

Repairs, salaries and incidentals.....1.00

Total cost.....\$16.38

With one fell swoop this investigator sweeps away all the individuality which plays so important a part in the management of every enterprise. The successes of the general manager in beating down the Lake Superior miner, in securing special rates of freight on ore and fuel; the glory of the superintendent in nipping off an extra 100 pounds from the fuel consumption, in economizing labor, crowding out a large output and keeping repairs down—all these little triumphs are sacrificed to conveniently round figures. He does not make any allowance for those irregularities which puzzle the founder and keep the manager awake at night, rudely transferring round sums from one side to the other of the balance sheet.

Still, such guessing is comparatively harmless. A much more dangerous form is that which is the outgrowth of efforts to boom some particular section or help to float some scheme. Every one in the iron trade is familiar with the somewhat boisterous and persistent attempts made in that direction in the South. That tidal wave of extremely cheap iron—on paper—is over. It has ebbed there and has apparently swept into Ohio. A writer in the Cleveland Leader has tried to show that iron can be made in the Hocking Valley for from \$11 to \$12. There can be no doubt that iron can be made very cheaply now in Ohio, under the present exceptional circumstances. We have every reason to believe that in the Mahoning Valley the best-managed furnaces can put foundry iron on cars for \$13.50, and forge irons for a little less, but we question whether any furnace in that State can do much, if anything, better than the figure just named. It appears, however, that "a syndicate which proposes to raise \$75,000 additional," to mine and smelt Mineral Ridge black band, figures out the cost of making 1 ton of American Scotch, according to the *Iron Trade Review*, as follows:

Iron ore (delivered at furnace).....\$1.50

Fuel......75

Limestone......75

Labor and salaries.....1.75

Incidentals (repairs, interest, &c.).....1.00

Total.....\$10.00

We do not wish to disturb the harmony of these figures, or tamper with the beautifully rounded total, but we venture to suggest that \$5 is a good deal too much for fuel.

In the Mahoning Valley \$4 is a very liberal estimate for the Connellsville coke necessary to produce a ton of pig iron. We recommend to the "syndicate" that they alter their estimate, as follows: Cost, \$7.50 for fuel, labor, limestone, interest and repairs, plus whatever the expenditure may be required to deliver the needed quantity of iron ore at the furnace, the latter item subject to later discounts.

An echo of the old-time Southern boasts of cheap iron is heard in the Birmingham

(Ala.) *Chronicle*, which indulges in some very foolish editorial writing respecting the cost of pig iron made at that important center. We quote as follows: "No ton of pig iron here costs \$12.50, or \$12, or \$11.50 or \$11. 'If it did our furnaces would stop. We can compete with any iron district. We are 'not losing money on iron, &c.' This statement is based upon the fact that Alabama iron is now selling for less than \$12.35, but as evidence bearing upon the question of cost this fact has very little value. We do not believe that any furnace manager in Birmingham is making iron as cheap as \$12 per ton, provided all the items of cost are included. If merely the daily expenses are charged against the product, they may perhaps be able to make the nominal cost \$10, or even less. But if this plan is pursued, we must assume that they have no intention of replacing their furnaces when worn out, and that the cost of building them has been already charged up to profit and loss. In the case of a majority of Alabama furnaces \$13 is much nearer honest cost than \$11. Journals which lend themselves to misrepresentations in this matter are not intelligently promoting the interests of their districts, but are playing into the hands of land speculators who hope, by persistent misrepresentation, to find a chance to sell out. Legitimate iron-making suffers by such falsehoods. The Northern and Western consumer who believes that Southern iron costs less than \$11 to make will not pay more than that for it in times like these. The fact is that most Southern furnaces have been losing money for some time past, and that comparatively little of the iron sold North and West has paid for its making. It is useless to misrepresent the facts. The plain truth will hurt only those whose interests need not be considered.

In a later issue the *Chronicle* prints the following estimate of cost in support of its statement above quoted:

2½ tons ore, at \$11.50.....\$28.50

1 ton limestone......70

1 7-10 tons coke, at \$2.30.....3.91

Labor and salaries.....2.25

Incidentals and depreciation of plant.....1.00

Cost of a ton of iron.....\$10.44

The *Chronicle* mentions no names, but hints that "the party making this estimate would contract under bond to supply the 'material at this estimate.' No doubt; but the furnaceman who should obligate himself in like manner to produce pig iron with the materials named at the prices given, would contract so rapidly that he would soon drop out of sight. If the *Chronicle* can induce any responsible furnace owner of Alabama to say over his own name that he can make iron in his own furnace at the figure named in its estimate, we promise the statement respectful attention. We have no doubt it could be made for \$9, or even \$8, in some furnace not yet built, but the product of projected furnaces does not count in the market.

Wheat and the Outlook for Business.

Time was when the condition and prospects of the cotton crop had a commanding influence in determining the industrial prosperity both in this country and in England. That time has gone by, however. In the discussions as to the future of business, cotton plays but a minor part. Wheat is now the prime factor, and it may be said truly that the condition of the American wheat crop has an important influence upon the industrial conditions of the world, determining at times, probably, the question of peace or war. American wheat is enabled to pay the heavy cost of transportation and compete in the markets of England with that produced in other countries on land of less value, and with labor employed at very much lower rates. This has been possible chiefly through the large areas of land cultivated under one management, with the employment of the most improved machinery. How great is the dependence of Europe upon American wheat can be seen from the amount that this country contributes toward its food supply. A table made up from recent experience gives the following as the aggregate consumption of the different countries of Europe in millions of quarters:

Austria-Hungary.....14

Belgium.....3

Denmark.....3

France.....41

Germany.....14

Great Britain.....38

Italy.....17½

Netherlands.....13½

Portugal.....1

Romania.....1

Russia.....104

Sweden and Norway.....14

Spain.....21

less tonnage for the railroads, and, of course, a falling off in the receipts of the railroads, and consequently in their ability to purchase. But, on the other hand, with a short supply the probability is that prices will advance, and with this advance will come a greater ability on the part of the farmers to pay transportation, and possibly an advance in the freight rates, with, it may be, a greater ability on the part of the railroads to undertake the needed repairs, and possibly extensions. A considerable deficiency in the wheat crop of the country might have the effect of enabling the railroads to secure higher rates for what they do transport. The increased cost of wheat that would come with such a deficiency would also have the effect of increasing the cost of living, and, in such a condition of affairs as the present, anything that adds to the prices of the necessities of life decreases the purchasing power of the wages received by the working class, and this prevents that increased consumption which is necessary to a marked revival of business. It is, of course, possible that our deficiency of wheat may be somewhat neutralized by a slight excess of the European yield, and consequently the demand from abroad may not be so great as it would be in a case of the least deficiency in the crops other than American depended upon by European countries. However, it is evident that the ruling prices for wheat will have a marked influence upon the business prospects of the remainder of the year 1885 and the beginning of 1886.

The Labor Situation West.

Our latest mail advices, bearing date of June 16, report the situation in connection with the labor strike in the West as somewhat mixed, but the indications are that the manufacturers have again thrown away the opportunity to secure a reduction in wages somewhat proportionate to the reduction in the selling price of iron and to the wages paid in other sections. To the utter surprise of the entire West, on last Thursday the secretary of the manufacturers' committee notified the president of the Amalgamated Association of the desire of the manufacturers for another conference. There seems to be a mystery, as yet unexplained, as to the occasion of this call. The majority of the manufacturers' committee themselves were ignorant that it was to be asked for until they received the notice to attend. Two reasons, either or both of which would be a sufficient explanation, have been advanced by the Pittsburgh papers. One is that the officers of the Amalgamated Association were desirous of another conference, but, as they called the last one, they wished that this one should be called by the manufacturers, and so intimated to them. The second explanation is that certain manufacturers in Pittsburgh had decided to sign the scale, and the conference was called by the manufacturers' committee for the purpose of getting the best terms possible before these signatures were appended. As yet nothing has become known which justifies the first assumption, except the signing of the scale by Oliver Brothers & Phillips, and the reported demand of Mr. Oliver that their firm be represented on the conference committee would give grounds for the belief that it was the second reason that led some of the manufacturers' committee to reconvene the conference.

The conference asked for was held on Saturday. The chief points of difference between the manufacturers and the Amalgamated Association were two, commonly referred to as the "old-rail or cracked iron clause" and the "sheet scale." Outside of these there have been some minor points of difference, chiefly relating to the way that the scale should decline between 2½ and 2 cents, the manufacturers claiming that the decline between 2½ and 2 cents should be the same as the ratio of reduction between 3 and 3½ cents, the Amalgamated claiming that the scale at 2 cents should be 10 per cent. less than the price paid on 2½ cents, and that this 10 per cent. should be distributed between the 2 and 2½ cent card. In this respect the manufacturers yielded to the Amalgamated Association, consenting that the scale at 2 cents should be a straight 10 per cent. reduction from the price paid at 2½ cents. In connection with boiling, the Amalgamated Association had also made a demand for a scale of prices for boiling swarth. The manufacturers conceded this likewise; this left only the cracked-iron clause and the sheet scale in dispute. Prior to the conference the cracked-iron clause stood as follows:

It is understood that for all finished iron, cracked or flawed, worked on any finishing mill, made out of old rails, the same shall be paid for.

This was altered at the conference so as to read:

It is understood that for all finished iron worked on any finishing mill, made out of old rails or old-rail iron, 10 per cent. extra above current prices shall be paid for same.

The words in italics indicate the changes made. The manufacturers' committee positively refused to agree to the retention in any shape of the old-rail clause, believing not only that the form in which it was presented was a virtual increase over the original form, but that the clause in any shape was objectionable, on the ground that it was a premium for bad work and was only the precursor of future demands. Heretofore, as a rule, only iron that was merchantable has been paid for; this was a proposition to pay

for iron that was not merchantable, and, if it was conceded, there was nothing to prevent a demand another year for payment for muck bar, and then for steel that was not merchantable. In the scale as signed by Oliver Brothers & Phillips there was a still further change made in this cracked-iron clause so as to read as follows:

It is understood that for all finished iron worked on any finishing mill "made out of a pile" containing two-thirds or more rails or old-rail iron, 10 per cent. extra above current prices shall be paid.

The other point of difference was the sheet scale. As we have heretofore explained, all the scales in force up to May 31st, 1885, were reduced 10 per cent. except the sheet scale. No reduction was conceded upon this, but it stands at 2 cents the same as at 2½. The reason given for this is that some years ago, when the sheet scale was made, the prices paid at that time were a reduction, and as they had stood the reduction at that time they ought not to be asked to concede any at present. The reply to this is that, while it may have been a reduction at certain mills, at most of the mills and on most of the iron made, it was an increase, the price in many cases for No. 24 at that time being \$7 and \$7.50, and the price made on the scale being \$8.

It is impossible to tell at this writing what the result of the conference of Tuesday will be; this will be given in our Pittsburgh market report, but the indications are that, unless the workingmen concede the demand of the manufacturers regarding the old-rail clause and the reduction in the sheet-iron scale, no conclusion will be reached. The manufacturers believe that they have already conceded more than they should in accepting the workingmen's idea of a 10 per cent. reduction, and the pressure upon them to refuse to sign the scale unless the Amalgamated Association strike out the old-rail clause and reduce the sheet scale 10 per cent. will be too great for them to withstand. There is a prevalent belief among the manufacturers that the signing of the scale by Oliver Brothers & Phillips, even if to them are joined some others that possibly may sign, by no means gives a victory to the Amalgamated Association. That the association is weak—weak as ever before—and that there are dissensions which in a very short time would lead to their disruption by the acceptance of the manufacturers' proposition, it is useless to deny. They are facts, and if, in the face of these known facts, the manufacturers of the West have not the courage to demand what they should have, and to wait until they get it, they deserve defeat. It is also evident that, should defeat come this time, the Pittsburgh manufacturers are responsible for it. They cannot, as they have heretofore attempted to do, divide the responsibility with mills west of them. Almost without exception mills outside of Pittsburgh are standing firm and insisting not only on the demands of the manufacturers, but that the last proposition of the manufacturers be withdrawn and a more radical one, providing for a greater reduction, be insisted upon.

The result of this contest is with the Pittsburgh manufacturers. It is all very well for them to sign the scales and give reasons why they must sign them. This one may urge that he has orders; another set forth his necessities; another that he makes various articles at his mill besides iron, and must sign in order to run; and a fourth may be actuated by no higher motive than a desire to be sharp and take some trade while his neighbors are idle. But, whatever may be the reason for signing the scale, each signature simply increases the probability of the defeat of the manufacturers, and the victory of the weakened and disunited Amalgamated Association. The Pittsburgh manufacturers have no enviable reputation among the iron manufacturers of other sections of the country, and if in the face of the weakness of the Amalgamated Association they suffer defeat, they certainly cannot take exceptions if the respect in which they are held by the iron trade of the country is not increased.

Commercial Bearings of the Franco-Chinese Peace Settlement.

The treaty of peace signed at Tientsin between France and China, while putting an end to hostilities between those nations, confirms the French protectorate over the Kingdom of Annam and the acquisition by France of the Province of Tonquin, which was the immediate cause of the war, having formerly formed part of Annam, and the latter having been tributary to China, which it adjoins, from time immemorial. While the dispute between France and China lasted, a dispute arising, as indicated, from the latter's claim of indirect sovereignty over Annam, France had prevailed upon the ruler of Annam to conclude, on August 21, 1883, a treaty acknowledging the French protectorate, and on June 9, 1884, an additional convention completed the pact. By virtue of this treaty France in future represents Annam in its relations with foreign nations. Annamite functionaries, while in office in the provinces, are under control of the French colonial authority, but France exercises direct control in everything relating to the collection of duties and the carrying out of public works. Thuan-an, the port of Hué, the capital, is garrisoned by French troops, and there are, besides, three more Annamite

ports thrown open to the world's trade—Quinhon, Tourane and Haiphong.

There having been ceded to France of Annamite territory under the Second Empire the six provinces of Lower Cochinchina, and, through the present treaty of peace, the Province of Tonquin, Annam is now reduced to a population of 6,000,000, occupying an area of 163,500 square miles, but without counting the tributary States of Laos and Moï. For all practical purposes France is the owner of the whole of Annam, Cochinchina and Tonquin, and thus the undisputed sway over a vast country inhabited by a sober, industrious, hard-working people, and teeming with most valuable resources, especially tin, silk and anise-seed oil, the latter being a very valuable specialty, peculiar to the country. All who have been on the spot agree that in tin and silk Annam, and Tonquin in particular, will have a great commercial and even industrial future, for the Annamites spin and weave silk to perfection.

In order to indemnify themselves for the cost of the war the French intend to discriminate against foreign merchandise imported, as well as in transit, to China, and furthermore levy extra port dues on vessels under foreign flags. These duties and dues will, however, be moderate, and after a couple of years France may find it to her interest to place foreign goods and flags on the same footing with French. But even supposing that this liberal policy should fail to be adopted, the development of the resources of Annam, and Tonquin in tin and silk will of itself have an important bearing on both commodities in the world's markets. Capitalists have formed companies at Paris and Lyons for the development of the resources of the new acquisition. Lyons, in particular, is bent on making the most of Tonquin for a permanent growing supply of silk, the silkworm disease having crippled French production at home. Reeling establishments will be created to reel silk in Tonquin after the European style, and positive results may be expected from this enterprise.

The canal system is to be enlarged and completed, the ports deepened and improved, and railroads and telegraphs introduced, of which that country possesses none thus far. Cochinchina is a kind of granary for China, the Philippine Islands and Java, no less than 400,000 tons of rice being exported from Saigon annually. The development of these countries under French rule and management will be watched with interest by all commercial nations.

WASHINGTON NEWS.

(From Our Special Correspondent.)

WASHINGTON, D. C., June 16, 1885.

Much inquiry is being made by exporters of American manufactured articles for information respecting the Mexican tariff. It should be stated for the information of such persons that the old Mexican tariff has been repealed, to take effect on July 1, when the new tariff adopted by the Mexican Congress will go into effect. The Government has received official copies of the new tariff, and is having it carefully translated for public information. It is expected to be ready by July 1. It might be well, therefore, for exporters of American manufactures to understand that the present schedules of Mexican customs have been materially changed.

RANDALL AND THE TARIFF.

Ex-Speaker Randall has left the city for the summer. He will give himself up to entire rest in anticipation of a long and busy session of Congress next winter. In October he will call the Committee on the Steel Producing Capacity of the United States together, when they expect to close up their labors. Speaking of the tariff, he said: "The subject is most likely to be reopened. In my opinion, the best tariff we could have is embodied in theory in the tariff plank of the Democratic national platform. It might be enacted into a law. It embraces the theory of tariff revision upon which I stand."

THE OHIO CAMPAIGN.

In a private letter from Senator Sherman, received by a friend in this city, the Senator says that his visit to the Pacific Coast has been exceedingly interesting. He found that the people were giving closer attention to the effect and benefits of the American economic system as represented in a protective policy toward American manufactures. His speeches in that line were well received. In regard to the Ohio campaign, the nominations then not having been made, however, he said that the tariff issue would be conspicuous, as the people insisted on the restoration of the duty on wool to its position in 1867. The Senator will be in Ohio next week.

CONSULAR REPORTS.

The three volumes on labor in Europe and other continents, referred to in this correspondence some time ago, are now ready for distribution. It is the most comprehensive and exhaustive work of the kind ever published. The three volumes embrace 2500 pages. The first two volumes contain the reports from the consuls of the United States in the several countries of Europe on the rates of wages, cost of living to the laboring classes, past and present wages, &c., in their several districts, in response to a circular from the Department of State requesting information on these subjects. The Secretary's letter reviewing the reports presents a valuable synopsis of the whole subject by countries. As a repository for information on the subject of labor, these voluminous reports will supersede every thing in that line.

RUSSIA WHEELING INTO THE LINE OF PROTECTION.

The Department of State has information of an increase, just imposed by the Russian Government, in the customs duties on cer-

tain grades of silk, amounting to 40 to 80 cents per kg., or an advance of from 18 to 36 cents per pound. The dispatch says: "This measure of the Russian Government has been taken in order to encourage and promote sericulture or the growing of silk in Russia, which country (in some of her provinces particularly) commences to produce some very good silk, and which industry, it is believed, will be very greatly advanced in consequence of this action." At present groge silks, one of the class made dutiable at a higher rate in Russia, are admitted into the United States free of duty.

THE TARIFF IN SWEDEN.

Minister Thomas, of Stockholm, reports that the large landed proprietors of Sweden are making great efforts to secure protection to the products of their estates. In the Swedish Diet, in January, a number of motions were made in both Houses to impose duties on the agricultural products of the Kingdom. Such articles, except cheese, are now duty free. The subject was referred to the Committee on Ways and Means. The dispatch says: "The proposed duties are for protection pure and simple. The exigencies of the Swedish Treasury demand no new tax. Not only that, but in so large a measure do the present revenues of Sweden exceed her expenses that the King, in opening the Diet, recommended a reduction of 30 per cent. on some of the chief taxes of the realm." It is shown that the pork import of Sweden amounts to \$2,000,000 a year, almost exclusively the product of the United States. In a later dispatch Minister Thomas reported that in his opinion all propositions to impose duties upon agricultural products imported would be rejected. He adds: "Much interest is manifested in the question throughout Sweden. Public meetings are held in many cities, and long petitions both for and against the proposed duties are forwarded to the Diet."

FRANCE AGAINST AMERICAN AGRICULTURE.

The Department of State has received the French texts and translations of the new French tariff law, imposing certain new duties on live animals and butcher's and salted meats imported from foreign countries, and imposing certain duties on cereals. The rate is as high as 25 francs a head on oxen, and 7 francs on fresh and 8.50 francs on salted meats per 100 kg. Wheat and rye flour per 100 kg. range from 6 francs for products of European origin or imported directly from countries other than Europe, to 9.60 francs for products of extra European origin imported from European bonded warehouses.

TARIFF IN NEW SOUTH WALES.

A complete list of the customs duties of New South Wales, revised to January 15, 1885, gives the following duties in United States currency on the articles named:

Iron—Galvanized in bars, bundles or sheets, or corrugated, per ton.....	\$9.73
Galvanized manufactures, per cwt.....	73
Wire, per ton.....	4.86
Rails, per ton.....	9.73
Shot, per cwt.....	1.31

While there are but 70 articles on the list, the list includes some of the most important American products.

The Victoria tariff embraces 93 different articles upon which an ad valorem duty of from 10 to 25 per cent. is levied, 237 articles upon which they pay a special tax, and 243 articles are admitted free. Among the latter articles are chain anchors, copper ore, galvanized iron, steel, cutlery, hardware, ironmongery, agricultural machinery (established 1883), tools, utensils. Carriage materials and steam engines pay 25 per cent. ad valorem.

Judge Treat having, during a trial in 1882, cut short a discussion of the relation of the four-pointed barb patent (called the "Ross") and the Glidden (two-pointed) barb by saying that he considered the four-pointed an infringement on the Glidden, it is now inferred that the suits based on patents covering both the two and four-pointed barbs, and owned by Washburn & Moen Mfg. Co. and L. L. Ellwood, which are now on docket, will result in favor of plaintiffs; and, therefore, most of the unlicensed manufacturers of barbed wire (clept "moonshiners") are anxious to secure postponements in suits pending. It being too late for the June term, they will make "hay while the sun shines," and should a trial and decision be reached in September, and a settlement with Washburn and Ellwood be impossible, it is probable that some will remove to districts in which another effort can be made, and resort to the secluded operation which secured for them the name of "moonshiners." There is, however, considerable loss profit now than during the time the royalty was \$15 per ton, and, therefore, smaller inducement to incur the hazardous competition that has been waged since 1882.

The formality of a commissioner's sale of the realty and machinery of the Harrison Wire Company was complied with on the 11th and 13th insts. All of the holders of first-mortgage bonds were represented at the sale on the 11th, and Messrs. Geo. T. Crane, of Kidder, Peabody & Co., New York, and James Cumiskey, of St. Louis, representing 149 of the 150 bondholders were the purchasers, bidding only \$30,000, in absence of other bids. Objection to approval of sale having been made on the 13th inst., the court permitted bondholders to make an offer of \$100,000, which was accepted.

An improved street rail is being substituted on Sixth street, St. Louis. It complies with the city ordinance in having a 5-inch surface and an upper surface of same shape as other tram or street rails, but instead of the wooden supports it has the advantage of a base, similar to steam road rails. The rails are 30 feet long and weigh 56 pounds to the yard. The ends are connected by fish bars, and the rails are supported by steel chairs 5 inches high, which rest on white-oak ties placed 6 feet apart.

The Consolidated Vapor Stove Company, of Cleveland Ohio, have filed two suits in the United States Circuit Court, at St. Louis, against the St. Louis Gasoline Stove Mfg. Co., and against Stafford, Lightburn and others, doing business under the name Safety Gasoline Stove Mfg. Co. These be-

long to a series of suits which the Consolidated Company are bringing to protect patents owned by them. In these suits, it is alleged, the defendants have infringed upon patent rights granted Charles Prentiss, March 4, 1873, for an improvement on gas heaters. Prentiss transferred his rights to Martin Hull in March, 1873. Hull applied for and obtained a reissue of the patent obtained April 24, 1877. He transferred his rights to the Hull Vapor Stove Company July 22, 1879, and in turn the patent was, December 4, 1883, transferred to the plaintiff company. Injunctions and accountings were asked for.

The Brennan Torpedo.

Experiments have for some time past been carried out to test the powers claimed for a new torpedo invented by Mr. Brennan, an Australian, and offered by him to the British Government. The Admiralty granted to the inventor the use of a casemate on the upper tier at Garrison Point Fort, Sheerness, and a torpedo factory was erected outside the fort, with a tramway running down to the sea beach. With these advantages and ample sea room in front the preliminary trials have taken place, and the mechanism has been so far perfected as to admit of an official inspection, which has just taken place, and is stated to have proved so satisfactory that the Admiralty have agreed to adopt the torpedo as a part of the national armament. The new torpedo, which is of the aggressive class, is described as distinct in principle from the Whitehead, the Harvey or any other system known in the service. In the many trials which have taken place in public a machine something like the section of a boat has been seen to descend to the water's edge by means of a carriage on the tramway, and plunge into the sea, through which it has shot at a marvelous speed, estimated by some observers at 50 miles an hour.

The torpedo is impelled by a steam engine, which is stationed within the fort, and acts upon it by winding in very rapidly two wires which are coiled around reels revolving inside the machine. As the wires are independent of each other, and actuate different propellers, the torpedo can be steered from the engine with great accuracy, and it has actually performed journeys of 2000 yards, working in and out among the shipping. Finally to be let go to strike the object aimed at, while the wires are drawn in for further use. The operator stands on the top of the fort and directs the course by a wheel or lever, and the same thing could be done from a ship by the commander in the conning tower. It is even practicable to stop the messenger in full flight and send it on again. The jets of light are produced by some chemical agency, and are simply to indicate the position of the torpedo at night; but, being screened in front, are visible only to the observers in the rear. Traveling with very little of its body above water, it would scarcely be discerned by an enemy until too close for resistance or escape, and as its speed increases the harder it is pulled, the last part of the journey can always be the fastest.

The judges of awards at the New Orleans exposition, after careful examination and comparison, have declared that the firm of Riehle Bros., proprietors of the Philadelphia Scale and Testing Machine Works, are entitled to three first-class medals—one for their self-adjusting railroad track scales, with rocking bearings; one for their spring-testing machine, and one for their well-known furnace charging scales. This is considered a high compliment to Philadelphia mechanics and one well deserved by this enterprising firm.

The Desloge Lead Company stockholders held their annual meeting June 9, at the office of S. W. Cobb & Co., St. Louis. The following were elected as composing the Board of Directors: Louis Fusz, George L. Allen, Firmin Desloge, John F. Valle, Jules Desloge, C. B. Parsons and S. W. Cobb. The new board organized with the following officers: President, Louis Fusz; vice-president, Geo. L. Allen; secretary, S. W. Cobb; superintendent and manager, Firmin Desloge.

The Shultz Belting Company, manufacturers of patent rawhide belting, of St. Louis, recently made shipments of their products to Belgium and Denmark.

The Joliet Enterprise Company, claiming under a patent granted L. E. Sunderland, assigned to them, and on their petition reissued May 12, 1885, a patent right to the principles of the construction of a barbed-wire machine, have sued the St. Louis Wire Mill Company and Wm. Eldenborn for infringement, asking the United States Circuit Court to restrain them by an injunction, and demand an accounting.

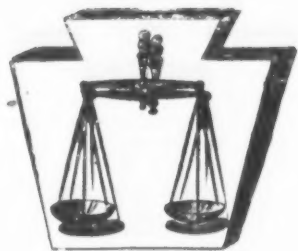
The Norwalk Lock Shop, at Greenwich, Conn., has been boycotted by the union. One of the hands was discharged, and the union took the case in hand, and the result was that they declared war on the shop. This is one of the oldest lock shops in the country, and employs 300 to 400 men. The union has men on duty to prevent hands from working if possible.

The Court of Appeals on Monday rendered a decision declaring the law to prohibit the manufacture and sale of oleomargarine in this State unconstitutional. The judgment of the General Term of the Supreme Court maintaining the constitutionality of the law was reversed.

Alfred Box & Co., of Philadelphia, obtained first prize and medal for best drill press at the New Orleans exposition, for their latest improved radial drill; also first prize for their double screw hoist.

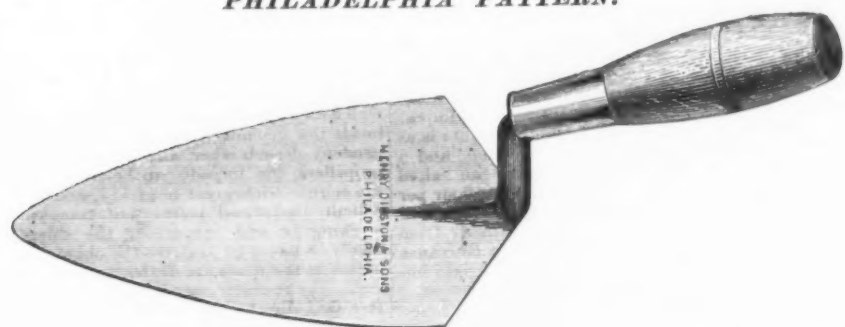
The MacMurray-Judge Architectural Iron Company, St. Louis, have secured order for the ironwork, aggregating \$18,000, for the addition to the State Penitentiary at Jefferson City.

HENRY DISSTON & SONS,

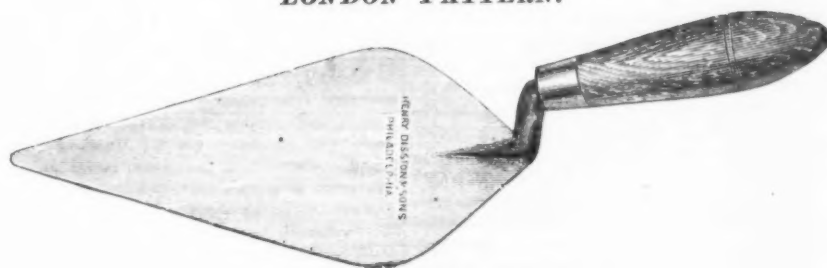


KEYSTONE SAW, TOOL, STEEL AND FILE WORKS, PHILADELPHIA, PA.

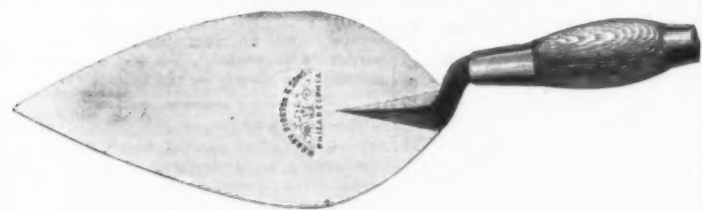
PHILADELPHIA PATTERN.



LONDON PATTERN.



BOSTON PATTERN.



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our manufacture of

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POINTING,
PLASTERING,
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Our Brick Trowels are made by a new process, which makes them a true taper from heel to point, giving them a spring and elasticity which none others possess. The handles are all made from white gum wood, which is more durable and less liable to split than any other wood, and with confidence we guarantee them to be the Best Trowels in the Market.

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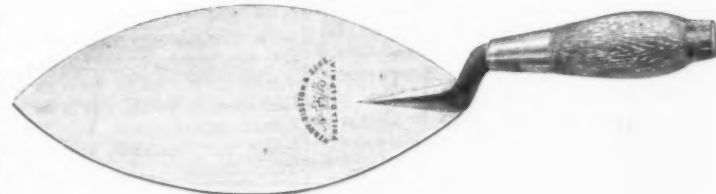
POINTING TROWELS, SOLID SHANK.



BRICKLAYERS' POINTING TROWELS.



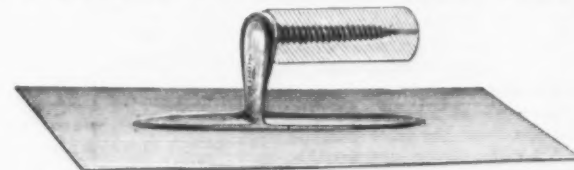
CUCUMBER PATTERN.



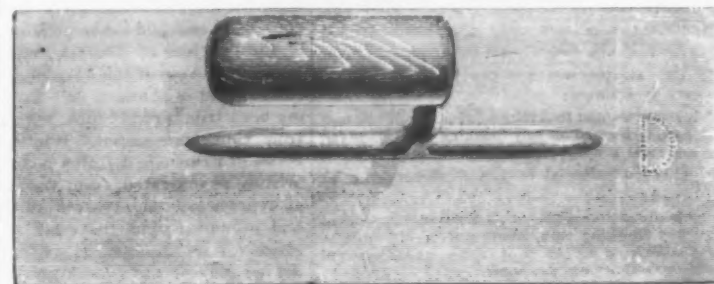
LOWELL PATTERN.



No. 1 PATENT TANG PLASTERING TROWELS.



No. 2 PLASTERING TROWELS.



We also Make a Full Line of the Above Goods in the Keystone Quality; Samples of
Either will be Furnished on Application.

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Hay Knives.

Hiram Holt & Co

and 6.	20.50 @	21.00
te Superior Coke, All Ore.	18.75 @	19.25
te Superior Coke, Under Mixed.	16.75 @	17.25
andard Ohio Black Band.	18.75 @	19.25
thern No. 2, \$17; Southern Silvery,		Open,
50; Close, \$16; Mill Iron No. 1, \$15.50 @	\$16,	

Trade Report.

New York Iron Market.

American Pig.—The week has been an exceedingly quiet one, the volume of transactions being very small. The market is dull and without any strength. While the leading companies maintain an attitude of unshaken firmness, there are always a number of anxious sellers. We quote standard brands of Lehigh and North River Irons, tidewater delivery, as follows: No. 1 X Foundry, \$17.75 @ \$18.50; No. 2 X Foundry, \$16.50 @ \$17.50; Gray Forge, \$15.25 @ \$16; the outside figure is asked for special brands. Outside brands sell for 50¢ @ \$1 less than our quotations.

Scotch Pig.—The trade in Scotch Pig drags along, being limited exclusively to retail lots. Nominal quotations for 5 and 10 ton lots are as follows: Coltness, \$21 to arrive; Gartsherrie, \$21 to arrive; Shotts, \$21 @ \$21.50 to arrive, \$22 from yard; Carnbroe and Glengarnock, \$19 @ \$19.50 to arrive; Summerlee, \$20 to arrive; Dalmellington, \$19 to arrive; Eglington, \$18 to arrive; Clyde, \$19 to arrive. Concessions are made for larger lots and for sales from dock.

Bessemer Pig and Spiegeleisen.—Buyers' and sellers' views are apart on Spiegeleisen on even the small business which is pending. Bids of \$24.50 are made, but \$25 @ \$25.50 is asked for 20%. We quote: Foreign Spiegeleisen, 20%, remains nominally \$25 @ \$25.50, 10% \$21.50 @ \$21.75, 45% \$42, and 60% \$52.50. Foreign Bessemer is nominally \$19 @ \$19.25. American Bessemer Pig is dull and weak. We quote nominally \$15, \$16 and \$17 for Nos. 1, 2 and 3, respectively, at furnace.

Bar Iron.—There is no improvement whatever to report in the condition of this market. Some leading mills in Eastern Pennsylvania report that they are well supplied with orders. On the other hand, mills which have been leaders in establishing low prices do not appear to have their capacity provided for yet. We quote for delivery here, in round lots: Common Iron, 1.4¢ @ 1.55¢, Medium, 1.55¢ @ 1.65¢, and Refined Iron, 1.65¢ @ 1.9¢, the lower figures being occasionally shaded. Store prices are 1.6¢ @ 1.75¢ for Common, 1.75¢ @ 1.8¢ for Medium and 1.85¢ @ 2¢ for Refined. Swedish Iron is quoted \$70 a ton.

Structural and Shaped Iron.—During the week a number of contracts aggregating about 1000 tons of Beams have been placed, a part of the material contracted for being Foreign Beams. Messrs. Maxwell & Graves, Boreel Building, are sending out circulars for bids on the Brooklyn Atlantic Avenue Road, asking for estimates on structures which will carry 2000 and 2500 lb. per foot. The contract will probably be let in a week or 10 days. Nothing definite has yet been heard in regard to the large Australian bridge. There were 14 bidders, of whom four were American works—the Union, Phoenix, Edgemoor and the Dominion Works of Canada. While some small less responsible English concerns have been lower bidders, a chance still remains that an American may obtain the work. We are informed that investigation has shown that the American contractors, if they get the work, will be able to do as well in procuring the raw material in this country as in England, and that, so far as Eye-Bars are concerned, the cost per ton is only \$60 here, as compared with nearly \$120 in England. Angles may be quoted nominally 1.9¢ @ 2.1¢, delivered, for round lots, and Tees at 2.1¢ @ 2.25¢. Store quotations remain 2.2¢ @ 2.4¢ for Angles, and 2.5¢ for Tees. American Beams and Channels are 3¢ from dock for all orders. Foreign Beams, in round lots, are quoted 2.5¢ @ 2.6¢ for Belgian, and 2.6¢ @ 2.8¢ for German.

Plates.—Business is quiet. Usual prices of Iron Plates are as follows: Common or Tank, 1.9 @ 2¢; Refined, 2.4¢ @ 2.5¢; Shell, 2.4¢ @ 2.5¢; Flange, 3¢ @ 3.5¢; Extra Flange, 4¢ @ 4.5¢. For small lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2.5¢ @ 2.6¢ on dock; Boiler, 2.4¢ @ 3¢ for Shell, 3.5¢ @ 4¢ for Flange, and 4¢ @ 5.5¢ for Extra Flange and Fire-Box. Round lots Open-Hearth Steel Bridge Plates, 2.5¢, cut to specification.

Merchant Steel.—The market is quiet and dull. Quotations for the range from ordinary to good grades are as follows: American Tool Steel, 7.5¢ @ 10¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; Crucible Machinery, 4.5¢ @ 6¢; Spring and Tire, 2.5¢ @ 3¢; Open-Hearth Machinery, 2.5¢ @ 2.8¢, and Bessemer Machinery, 2.4¢ @ 2.5¢; English Tool, 13.5¢ @ 15.5¢.

Steel Rails.—With the exception of small lots of light and standard sections, nothing is being done. There are a few lots of moderate size in the market. Some of the railroads are showing a tendency toward asking for postponement of deliveries, which causes some embarrassment to some of the mills. We quote nominally \$27 @ \$27.50, noting that probably large lots could be placed at round concessions.

Steel Wire Rods.—Only a number of small spot lots, ranging between 100 and 500 tons each, have been placed at about \$33. Larger lots are still the subject of

negotiation between buyers and sellers, the latter hoping to do better than \$38.50. We quote \$39 @ \$39.50.

Old Rails.—A lot of Old Rails, estimated between 8000 and 10,000 tons, has been sold during the week by a Texas road, for delivery on the Delaware, at \$17.25, which is parity of about \$16.75 in this market. We hear of about 3000 tons additional at \$16.50. We quote \$16.75 @ \$17.

Scrap.—There have been no transactions of magnitude, and quotations remain nominally \$18 @ \$18.50 for No. 1 from yard.

Rail Fastenings.—The market is dull. Quotations for large lots are 2.6¢ @ 2.65¢ for Bolts and Square Nuts; 2.75¢ @ 3¢ for Bolts and Hexagon Nuts, and 1.6¢ @ 1.7¢ for Splice Bars. Railroad Spikes are quoted 1.8¢ @ 1.9¢.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, June 16, 1885.

Pig Iron.—The market remains in an unusually depressed condition, sales in quantity being practically impossible, unless by special arrangement between the parties. It cannot be said that prices are lower, but there is no market for anything except in a retail sort of way, and, as before stated, if sellers want to go beyond that, prices and terms have to be made in proportion. There are some holders to whom these remarks may not apply, but there are many to whom they do apply, and no fair report of the market can be made without referring to this phase of it. What the ultimate outcome will be is a problem which only time can solve. The outlook is not encouraging, and notwithstanding the rose-colored predictions of a New York daily, which assumed to speak for the Ironmasters of Eastern Pennsylvania, the demand has not improved nor is it likely to improve until after mid-summer, if it does then, which, while many hope for, but few expect. Prices are low enough truly, but the trouble is that there is so little consumption in proportion to the supply, and, while the supply would be increased on the first intimation of a demand, there is no prospect of increased consumption for some time to come, at all events. Buyers recognize this individually. They know that the demand for their goods is extremely light. They see that Pig Iron is cheap, and cannot possibly be much lower, come what may; but they have no use for Iron except in small quantities; therefore they are afraid to stock up. This appears to cover the whole ground, so there can be no change for the better until there is either an actual increase in consumption or a reasonable certainty that we are nearing the point when there will be an increase. Sales in the meantime have been in small lots at about \$15.50 for Gray Forge, \$16.50 for No. 2 and \$18 for No. 1 Foundry, delivered at tide. Large lots, as already stated, can only be placed subject to special arrangement. Southern Iron has been sold at \$14.25 for No. 3 Forge, Philadelphia, but there is very little demand for it, and, at the prices likely to be obtained, sellers are not urgent for business.

Foreign Iron.—Business is extremely quiet, no sales of any amount having been made for two or three weeks past. Some four or five weeks ago reference was made to an inquiry for 5000 tons 20% Spiegeleisen, with bid at \$24.50. It is understood that the contract has since been closed, supposed to be at about \$25, although \$25.50 was asked. Bessemer could be laid down at low figures, but there is no demand except for special brands, for which \$19 @ \$19.25 is asked. English Crops would be taken at \$18, but \$19 is asked. Welsh Crops offered at \$17.50 @ \$18.

Muck Bars.—Demand for small lots is fair, with sales at \$27 @ \$27.50, delivered, for best qualities; other descriptions offered at \$26 @ \$26.50, without leading to business.

Blooms.—Prices nominal, as there is scarcely anything doing. Asking rates as follows: Soft Basic Blooms, \$33.50 @ \$35; Billets, \$38 @ \$39, and Siemens-Martin \$40 @ \$42. Domestic Blooms, \$30.50 @ \$32, delivered, for Nail Plate, and \$35 @ \$36 for Plate and Sheet Blooms. Other descriptions dull and prices nominal, as follows: Charcoal Blooms at \$50 @ \$52; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$34 @ \$35; Northern Ore Blooms, \$34.

Bar Iron.—There has been some little improvement in demand, but chiefly for small lots to cover immediate requirements. The mills are fairly well employed in one way or another, and are likely to remain so during the balance of the month. The outlook beyond that is somewhat uncertain, but there is an impression that the usual mid-summer suspension, following on the partial lockout in the West, will leave stocks at an extremely low point, and that the demand during the last half of the year will therefore be somewhat better than it has been during the first half. Prices are unchanged, and, as a rule, almost at the lowest on record. Sales of good Refined Iron at 1.65¢ @ 1.75¢, although 1.8¢ is the nominal rate for the best makes. Skelp Iron has sold to a moderate extent, so that, on the whole, the mills have had rather more work on hand than they have had for some time.

Plate and Tank Iron.—Business has not been active in this department, small lots of Boiler Plate comprising the greater portion of the business. Large consumers are doing little or nothing at present, so that the indications are not favorable to immediate improvement. Prices as last quoted, viz.:

Ordinary Plate, 2¢; Tank, 2¢ @ 2.1¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Flange, 3.5¢ @ 3.75¢; Fire-Box, 4¢ @ 4.25¢.

Structural Iron.—There is more doing and more inquiry, with a fair probability of several good-sized orders being placed before the end of the month. No large lots are mentioned, but the aggregate amount of business offered is considerable for the times, and manufacturers feel somewhat encouraged by the improved outlook, especially for bridge work. Prices as last quoted, viz.:

2¢ @ 2.1¢, delivered, for Angles; 2.1¢ @ 2.15¢ for Bridge Plate; 2.3¢ @ 2.4¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—The demand is about an average for the season, but complaints in regard to prices are as numerous as ever. A great deal of inferior material is offered at low figures, but for standard qualities prices are about as follows:

Best Refined, Nos. 26, 27 and 28, 34¢; Best Refined, Nos. 18 to 25, 34¢; Common, 1/4¢ less than the above. Best Bloom Sheets, Nos. 28 to 35, 44¢; Best Bloom Sheets, Nos. 16 to 21, 44¢; Blue Annealed, 2.5¢; Best Bloom, Galvanized, discount, 60¢; Second quality, discount, 62 1/2¢; Common, discount, 65¢.

Wrought-Iron Pipe.—There is no change to note under this head, the general position of the market being much the same as noted last week. There are few large orders being placed, but the demand for small lots is fair and sufficient to keep the market moving. There are some who are not altogether unprepared for a slight advance in prices, but for the present at least it is difficult to see how this will be effected. The following appear to be fair average discounts on retail lots: Lap-Welded Black, 65 @ 65 and 5%; Butt-Welded Black Pipe, 45 @ 47 1/2%; Butt-Welded Galvanized, 35 @ 37 1/2%; Lap-Welded Galvanized, 45 @ 47 1/2%; Boiler Tubes, 57 1/2 @ 60%.

Nails.—The market is quiet and unchanged. Nails are called for only in small quantities, and these in the aggregate do not make anything like a satisfactory demand. There is, however, no undue pressure to sell; hence prices are, as a rule, fairly well maintained at about \$2.25 per keg for retail lots, but on larger orders these figures are shaded according to size and quantity taken. Steel Nails move very slowly, and are quoted nominally at \$2.35 per keg.

Steel Rails.—There is not much doing, but prices show no material change. Small lots sell at about \$27.50 at mill, but orders for 1000-ton lots and upward could be placed at less money, providing deliveries were convenient to the sellers and terms of payments satisfactory. The mills are tolerably full for the present, but the outlook does not appear to be very encouraging.

Old Rails.—There is nothing doing of importance. A few small lots have been taken at \$17.75 @ \$18, Philadelphia, but lots to arrive could not be placed at over \$17 @ \$17.25. In fact, the demand is so uncertain that it is hard to say what price could be realized unless some one was actually wanting. Deliveries in the interior are quoted \$18 @ \$18.50 asked, but buyers do not offer within 50¢ of those figures, and appear to be in control of the position at present.

Scrap Iron.—There is a fair demand, and prices are fairly maintained. The quotations given below are for Philadelphia deliveries—interior deliveries would bring about 50¢ per ton more—as follows: No. 1 Wrought Scrap, \$17 @ \$18; No. 2 do., \$12 @ \$13; Horse Shoes, \$22 @ \$23; Turnings, \$13 @ \$14; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$16 @ \$16.50; Fish Plates, \$22 @ \$23; Cast Scrap, \$13 @ \$14; do. Turnings, \$9 @ \$10.

Pittsburgh.

[Special Dispatch to The Iron Age.]

PITTSBURGH, PA., June 17, 1885.

The result of the conference between the manufacturers and Amalgamated Association yesterday was in the nature of a compromise. After a session of eight hours the majority of the Pittsburgh members of the manufacturers' committee, the members from other sections withdrawing, agreed to sign the scale presented by the Amalgamated Association, with the exception of the Old-Rail clause and the Sheet-mill scale, these to be referred for settlement to committees composed of Sheet-rollers and manufacturers and workmen and manufacturers using Old Rails. The result is a victory for neither side. The Amalgamated consent to the signing of a mutilated scale—that is, with the Old-Rail clause and Sheet-mill scale in abeyance, which they have heretofore refused to permit, and the manufacturers have signed a scale without an acceptance of their demands on these two clauses. At present it is doubtful what the manufacturers outside of Pittsburgh will do. Most of the Pittsburgh mills will be in operation this week. The result was not reached without a good deal of friction, and is by no means acceptable to many manufacturers.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., June 16, 1885.

Every now and again some of the knowing ones discover that the end of the hard times is near at hand; they are sure that the dark clouds which have been hanging over us so long are about to disappear, and that general business is sure to improve. It is to be hoped that the predictions of such may be

fully realized, but to the ordinary observer the outlook is not brighter now than it was a week or a month ago. Here in Pittsburgh all branches of trade are extremely dull; since the stoppage of the Iron mills the number of idle men has been largely increased, many of whom neglected to put away anything for a rainy day, and these, of course, are in straitened circumstances. As a consequence, economy is the order of the day on the part of the working people, and all branches of trade are depressed thereby. Never before, perhaps, were there so many idle in this city, Allegheny and the adjoining boroughs. Rents have fallen materially; hence the outlook for building and building material is not near as good as it was a month or six weeks ago. A very discouraging feature connected therewith is that, notwithstanding the depressed condition of the real-estate market, depreciation in rents, &c., municipal taxes are as high as ever, with but little prospect of any immediate reduction. This, no doubt, is the situation in many of the leading cities throughout the nation, and bad municipal government has not been without its effect in bringing about and continuing the present depression.

The indications at this writing are that the labor dispute here will soon be arranged. There is no telling what a day may bring forth, and before this letter is in type everything may be settled.

Pig Iron.—There is great dissatisfaction with the present condition of the market, and the outlook as regards the near future is by no means encouraging. All that is required to supply the few mills in operation is not a drop in the bucket, and notwithstanding there is no trouble among the founders, the demand for Foundry Iron is also exceedingly light; many of the foundrymen say they have little or nothing to do. Even if the strike was brought to a sudden close, it is doubtful whether some of the mills would be started, as they have no orders, and there is not much encouragement in the present condition of affairs to "pile up." Stocks are not large; mill yards, as a rule, are bare, but the consumption is also light; hence, notwithstanding stocks are comparatively light, they are largely excess of present wants. Prices continue weak and irregular, but without quotable change. We quote as follows:

No. 1 Gray Forge, \$15.25 @ \$15.50, 4 mos. No. 2 Gray Forge, 14.50 @ 14.75, 4 " White and Mottled, 13.50 @ 14.00, 4 " All-ore Mill, 15.75 @ 16.25, 4 " No. 1 Foundry, 16.50 @ 17.00, 4 " No. 2 Foundry, 15.00 @ 15.50, 4 " All-ore Foundry, 18.00 @ 19.00, 4 " Cold-Blast Charcoal, 25.00 @ 27.00, 4 " Bessemer Iron, 17.50 @ 18.00, 4 "

Muck Bar.—Nothing doing, and in the absence of sales we omit quotations.

Manufactured Iron.—The general position of the market remains unchanged. Even if the strike was brought to a close within the next 24 hours, it is doubtful about some of the mills starting up at once, as some of them have no orders, while others are anxious to make improvements and repairs. The largest consumers—the railroads—are buying just as little as they can possibly help, and we may add that this is the rule with consumers generally.

Nails.—The strike and consequent shutdown have produced a firmer market, and within the past two weeks an advance of 5¢ per keg has been established; there are no sellers of Iron Nails under \$2.05, 60 days, 2¢ off for cash, in car lots, and some makers, low in stock, are asking \$2.10. In the present condition of affairs manufacturers, as a rule, are indifferent about selling. Stocks both here and at Wheeling are light. At the meeting of the Western Nail Association at Cincinnati, last Wednesday, no business of importance to the general public was transacted.

Wrought-Iron Pipe.—The market is firm at the recent advance, with a fair degree of activity, but orders are mostly small. So far as we can learn, but few large contracts have been made recently. It is well known, however, that some of the mills stopped are considerably embarrassed by unfilled contracts, made prior to the strike. Prices remain unchanged. Discounts on Black Butt Welded Pipe, 1 1/2-inch and smaller sizes, 45 @ 50%; on Galvanized do., 35 @ 40%; on Black Lap-Welded Pipe, 1 1/2-inch and larger sizes, 65 @ 65 and 5%; on Galvanized do., 45 @ 50%. On Selected Pipe, or Pipe cut to specified lengths, the discount is 5% less than the rates above quoted. Discount on Boiler Tubes, 60%. Two-inch Oil-well Tubing, 10¢ per foot, net; 5 1/2-inch Oil-well Casing, 36¢ per foot, net.

Steel.—No important change to note; demand continues light, while prices remain unchanged. Steel Nail Slabs, for which, of course, there is no demand there was before the shut-down, are still quoted at \$29 @ \$30 per ton. Best brands Refined Cast Steel, 8 1/2¢; do. Crucible Machinery, 4 1/2¢ @ 4 3/4¢; Open Hearth and Bessemer, do. 3¢.

Old Rails.—There is little or no demand at present, and with few offerings the market is weaker, although we hear of no offers being made to sell under the prices quoted a week ago. One of the largest sellers in this market reports having had no inquiry for several weeks. We continue to quote Iron Rails at \$19, and Sheets at \$16.50 @ \$17.50, according to lengths.

Steel Rails.—Heavy Sections are still quoted at \$27 @ \$28, cash, on cars, at mill, according to character, delivery, &c.

Railway Track Supplies.—The demand continues light, while prices remain unchanged. Spikes, 1.0¢, 30 days, delivered; Splice Bars, 1.65¢ @ 1.75¢; Track Bolts, 2.65¢ @ 2.75¢ with Square and 2.8¢ @ 2.85¢ with Hexagon Nuts.

Crop Ends.—There have been no sales reported recently, in the absence of which we repeat former quotations. New Steel Rail Ends, \$18.50 @ \$19; Steel Bloom Ends, \$18 @ \$18.25.

Scrap.—There is little or nothing doing, and it is difficult to quote prices correctly in consequence. There was a time, years ago, when a strike was a harvest for the Scrap dealers, but since the finishers have all gone into the Amalgamated Association it is very different. There is no alternative now when there is a strike but to shut down. No. 1 Wrought Scrap is still quoted at \$17 @ \$18 per net ton, outside figure for Selected; Old Car Wheels, \$16 @ \$7, gross ton.

Coke.—Market remains much the same as noted for some time past; Blast Furnace Coke is still quoted at \$1.20 per ton, free on cars at ovens.

Chicago.

Office of The Iron Age, 86 and 88 Clark St., CHICAGO, June 15, 1885.

Hardware.—Jobbers report a very busy week. Country dealers are not placing large orders, but there appears to be a general demand for nearly everything in the line. Scythes, Snaths, Rakes and Steel goods of all kinds are most freely called for, but Builders' Hardware and Carpenters' Tools have had more than the average season call during the first half of this month. The fight on Cartridges during the week was much less aggressive than generally anticipated. The discount 60, 10, 10 and 2, as announced in the circulars of the Combination Cartridge Association, was promptly met by the Meacham Arms Company. The Simmons Hardware Company followed with a price list announcing 60, 10, 10 and 5, and created some anxiety as to what further reduction would be made by Hibbard, Spencer, Bartlett & Co. Whispers among the trade made the announcement of 70 or 60 and three 10's probable, but in this all have been disappointed up to the present time, as no change from the net price list published in last week's Iron Age has been made. Prices on Locks and Padlocks have been advanced 5%, making present discount 66 2/3% off. The new prices issued for Flat-Head Screws had a tendency to stiffen the market and create a great deal of kicking. According to the circular, the Russell & Erwin Mfg. Co. had the privilege of canceling orders at 90% off, but this privilege has not proved very satisfactory to dealers, as numerous orders were canceled when the advance occurred, and those who have suffered by it are wreaking vengeance in words against the firm. Jobbers are quoting 85 and 10% as bottom prices to large buyers, and 5% advance on this price to the small retail trade. Prices have also been advanced on Strap and T Hinges on account of the pooling operation which has recently gone into effect. Jobbers are now quoting 70 @ 70 and 5% as their best selling price, according to the quantity. The advance on Pig Tin has caused an advance of 2¢ per lb. on strictly Half-and-Half Solder, making jobbers' price 14 1/2¢ per lb. to country dealers. A few other changes have occurred during the week, but none of sufficient importance to require special mention.

Barb Wire.—There continues to be a remarkable demand for small lots for this season of the year. Trade in carload lots is very light, but not more so than is customary during the month of June. Some change in price has occurred during the week, and we now quote for Painted Two and Four Point Cattle Wire, \$3.60, and \$3.70 for Two and Four Point Hog Wire, and 1¢ additional for Galvanized. It is possible that these prices will be further advanced within a few days, as a meeting of the manufacturers has been called for some time during this week, with a view of advancing prices and taking some action regarding the manufacturing of Wire during July and August. In unlicensed Wire the market seems to have quieted down to such an extent that we hear very little of what is being done by those who still have stocks in factory or in the hands of dealers on sale.

Nails.—The aggregate demand during the past week has been less than the week previous, though small orders are coming in very freely. The falling off may be accounted for by the advancing of prices so promptly in this market, whereby many buyers of carload lots are held in abeyance. Iron Nails are quoted at \$2.25 and Steel Nails at \$2.35 in quantities less than carload lots. Stocks are kept pretty even by the refusal of jobbers to sell in carload lots except when they are permitted to make up their own selections. Stocks of 8d., 10d. and 20d are more nearly exhausted than any of the other sizes, but we have not heard of any jobbers who are unable to fill their orders up to date. Prices quoted from Wheeling mills to jobbers in this city are \$2.20 @ \$2.25, delivered, and announce that the stock remaining in the hands of manufacturers is considerably broken and is being rapidly exhausted. It is possible that the price from store will be advanced by jobbers and Iron merchants in this city at their weekly conference, which occurs to-day. We learn that Nail mills in the West, by special agreement, will not start up until July 1, no matter what action is taken by the Nail cutters on prices, and not even then unless prices have been advanced and stocks sufficiently exhausted to hold the market equal to \$2.25 for Iron and 5¢ additional for Steel, at mill.

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American Pig Iron.—There has been what may be called a fair June trade during the past week. From large buyers business has been small, but a great number of carload orders have held the total volume of tonnage up to a fair average. The market, moreover, in a general sense, is wanting in spirit and strength. The quotable prices have not been changed, but every now and then a weak seller is heard from who has found it necessary to make some slight concessions over his competitors as a matter of self-preservation on an odd lot. In the present state of the market it is not surprising that there should be a goodly number of these lots on hand, which are not permanently before the buyer, and usually make their appearance when prices show firmness on regular trade. These odd lots are not confined to any one class of iron, but more especially are found among Ohio and Southern Irons which have been shipped from some of the more remote furnaces. Each occurrence of this kind has a tendency to distract the little firmness that the market acquires, and keeps buyers cautious and undecided as to placing contracts for more than immediate requirements. The month of June, according to former customs, should bring out numerous inquiries from implement manufacturers for their year's supply, but up to the present time there have been but few inquiries, and the opinion prevails that this trade will be a month or six weeks later than usual, and in all possibility there will be very much less contracting done than heretofore. We hear of one sale of 600 tons Union Bessemer and several 50 and 100 ton lots for the week, but the greatest activity consists of carload lots in which Ohio and Soft Irons figure most prominently. In looking over the field with a view of ascertaining whether better prices were probable, a prominent manufacturer stated that the visible supply of Lake Superior Charcoal Iron would be sufficient to meet all demands during the next six months of this year. Manufacturers who have been keeping their furnaces in blast with the hope that a revival of trade would bring them better prices are greatly discouraged, and some of those who are making the best brands in the market are seriously contemplating the blowing out of their furnaces. Upon the other hand, we learn that several furnaces anticipate going into blast between this and the first of August. As they will have to establish a reputation for their iron, they will necessarily be compelled to place it upon the market at lower figures than old and reputable brands command. There are thousands of tons of iron piled up in the yards of makers who are waiting for better prices that will not likely be carried over for a year or two when they see the trade being absorbed by new makers and new brands. For standard brands, carload lots, four months, we quote Lake Superior Charcoal, Nos. 1, 2 and 3, \$19.50 @ \$20; Nos. 4, 5 and 6, \$20.50 @ \$21.50; Lake Superior Coke, All Ore, \$19; Cinder Mixed, \$17 @ \$17.50; Ohio Standard Black Band, \$18.50 @ \$19; Southern No. 2, \$16.50 @ \$17; No. 3, \$15; Mill Iron, \$14 @ \$14.50. The price on Southern No. 2 Iron has been weak for some time past, but sales agents were unwilling to acknowledge the fact, as so little of it was being sold, and, further, for the reason that Ohio Irons were following the Southern brands down as rapidly as they declined. During the past week, however, we learn that several hundred tons of a standard brand were sold at about the latter figure, which is considered a fair criterion for the value of all other brands.

Merchant Steel.—Trade very light, and the demand, if anything, less than the previous week. We renew former quotations on Bessemer at 7½¢ @ 9¢; Open-Hearth and Bessemer, 4½¢; Crucible Cast Spring Steel, 4½¢; Crucible Machinery, 4½¢, and Sheet Steel ranging from 8½¢ to 13½¢. High grades of Tool Steel and special Steels have been in better request in the mining regions than the week previous, but the aggregate sales were about the same.

Bar Iron.—The most remarkable feature of the week has been the falling off in demand. This was one of the things least expected by the trade. The general anticipation was that, with the closing down of the mills and the possibility of stocks being light, the demand would greatly improve, if but temporarily. Upon this supposition jobbers of Common Iron in this city immediately advanced their rates to the same figures that New Puddled was selling at, and are now greatly disappointed, after having advanced the price, that they do not sell more iron. The demand for New Puddled Best Refined Iron is also much lighter than was expected, and fewer inquiries are received from country dealers and heavy buyers, such as railroads and large manufacturing establishments. For this class of iron 1.8¢ rates from store continue to be firmly adhered to for all buyers. On Common and Old-Rail Iron the same rates are demanded, but a perceptible weakness is visible among dealers as well as buyers.

Structural Iron.—The Structural-Iron market is somewhat better than it was a week ago. Several inquiries have been made or large building operations, among them the Rock Island Arsenal, who are asking bids on 135 tons of I-Beams, and one or two other bridge contracts which are about to be let on some of the Western railroads. Orders for iron for building purposes are very light, with the exception of those for small buildings, in which Beams and Channels are no prominent part. Prices continue the same as heretofore.

Galvanized Iron.—Business in the Galvanized-Iron market continues to be about the same as for some weeks past. We renew the following quotations as jobbers' retail prices: Juniata, discount 60 and 5%; Charcoal, 60 and 10%; Refined, 60, 10 and 5%.

Black Sheets.—While the market is quiet and nothing visible to induce the action, we are compelled to advance our quotations on light grades as follows from store: Nos. 8 to 14 at \$2.50 @ \$2.60; Nos. 15 to 17 at \$2.80 @ \$2.90; Nos. 18 to 20 at \$2.80 @ \$2.90; No. 22, \$2.80; No. 24, \$3; Nos. 25 and 26, \$3 @ \$3.10; No. 27, \$3.10 @ \$3.20. These changes are made by jobbers, some of whom have large stocks on hand, while there are others with scarcely any stock in their houses.

Old Rails.—There has been considerable inquiry for Old Steel Rails during the week, and prices are quotable at \$14.50 @ \$15 for Long Straight Sections. There is nothing doing in Old Iron Rails. Holders seem to be unwilling to sell at prices that would be met by the mills which are idle.

Scrap Iron.—Buyers of Scrap are receiving abundance of stock at the prices they are paying, as they are compelled to pile it up in their yards and take the risk of realizing upon it when mills again go in operation. There being no transactions in Mill Scrap, we make a nominal quotation of \$14 for No. 1; \$9 for No. 2; No. 1 Forge \$16.50 @ \$17, and give the following as dealers' purchasing prices: No. 1 Wrought Scrap, ½ net ton, \$14; Cast Scrap, ½ net ton, \$12; No. 1 Stove-Plate Scrap, ½ net ton, \$8.50 Wrought Turnings, ½ net ton, \$9; Cast-Iron Borings, \$7; Old Plow Steel, \$3; Tool Steel, ½ net ton, \$14; Locomotive Tire, ½ net ton, \$15.50; Buggy Springs, ½ net ton, \$14; Malleable Scrap, \$6.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, June 18, 1885.

The usual dullness of the summer months is to be seen in all kinds of business throughout all the trade centers of the South, and there is nothing occurring to excite particular attention. The weather has been extremely favorable for all the growing crops, and with the exception, perhaps, of wheat there is a prospect now of a full yield of everything in the crop line. There appears to be no lack of prospective new enterprises through the South, and especially in this district. Many of them are undertaken by practical men of small means and who are generally successful in their undertakings. Especially is this so with most of the cotton factories through Tennessee, North Georgia and Alabama. In general business we can note a more encouraging feeling. The old-fashioned way of large profits and long credits is entirely done away with, and it is simply a question of cutting down expenses to actual profits among business men, and all are simply looking forward to better times and endeavoring in the meantime to hold their own, at least, if they cannot make any money. Without a single exception our manufacturers are running full and meeting with ready sales for their products, and probably some of them are making a little money. The lumber business has certainly been a remunerative one in this section, and the mills have had all that they could do, their products meeting with ready sales in the North and East. Among our furnaces one or two are out for repairs, and the others are making their usual quota of iron, and as a general thing marketing it.

Pig Iron.—Most of the furnaces are selling up to their output, although there is being an effort made to produce more of the foundry grades than before. As matters now stand there is a scarcity of these grades, and it is all being taken as fast as made, and contracts are being offered for future delivery at prices ranging from \$14 to \$14.50 for No. 1, and \$13 @ \$13.50 for No. 2. Considerable No. 3 is being sold at \$12 @ \$12.50, and there is quite a demand for Silvery. Forge grades are, however, neglected, and much of it is being piled up in the yards. Large quantities are, however, being shipped on old contracts for future delivery. The Citico and Rising Fawn are both out for repairs, but expect to go in again within the next six weeks. The former, being comparatively new, has yet a reputation to make for her output, while the character of the latter has given her product a reputation that obviates the necessity of seeking a market for her output—she is generally sold several months ahead.

Cast Pipe.—The works are still well supplied with orders to their full capacity, and are likely to be for some time to come. A large number of Southern cities have been moving vigorously on the question of waterworks, and many of the smaller towns are now considering the question of putting them up. This has given an impetus to this branch of business, and has also added much to the business of the Southern foundries.

Hardware.—The number of buildings still going up has a tendency to keep Structural Hardware fairly active. There is also a fair demand for all kinds of carpenter's tools, but for other than those there is not much doing.

Miscellaneous.—The season for all kinds of Harvesting Implements is now in order, and large quantities are being received at this place, and passed through to points further South. It is a notable fact that many planters who before the war worked

their 50 or 100 hands are now working as much land, with better result, with one-fourth the labor from intelligent workmen and improved machinery, and there has been no improvement in the industry of the new South more worthy of note than in this particular line. The grain in one end of the sack and a stone in the other to balance it may be considered a thing of the past.

Cincinnati.

JUNE 15, 1885.—Pig Iron.—The state of affairs regarding this article reported last week continues. Consumers are doing but little, and stocks in their hands will, they assert, last them through the summer if present dullness of trade continues. An occasional replenishing is all that is being done. Efforts made to induce consumers to lay in stocks at concessions meet with little success, simply for want of confidence in the future. Sales have been made during the past week in car lots at the following prices:

CHARCOAL.	
Hanging Rock No. 1.....	\$21.00 @ \$21.50
Hanging Rock No. 2.....	20.00 @ 20.50
Southern No. 1.....	18.00 @ 18.50
Southern No. 2.....	16.50 @ 17.50
COKE IRONS.	
Ohio and Pennsylvania No. 1.....	17.00 @ 18.00
Ohio and Pennsylvania No. 2.....	16.00 @ 17.00
Southern No. 1.....	16.00 @ 17.00
Southern No. 2.....	15.00 @ 16.00
JACKSON COUNTY SOFTENERS.	
No. 1.....	17.50 @ 18.50
No. 2.....	16.50 @ 17.50
No. 3.....	16.00 @ 17.00
Other kinds.....	15.00 @ 16.00
CAR-WHEEL.	
Hanging Rock Cold Blast.....	28.00 @ 29.00
Hanging Rock Warm Blast.....	19.00 @ 20.00
Southern Warm Blast.....	17.00 @ 18.00
Southern special brands.....	24.00 @ 25.00

Four months on cars here, or 50¢ ½ net less for cash. Orders filled from furnaces will be less the freight to Cincinnati.

Louisville.

W. B. BELKNAP & Co., Louisville, under date of June 15, 1885, report as follows: The Bar Iron market is characterized by anything but vitality, and no amount of starvation seems effective to stir it out of its lethargic condition. No amount of persuasion will compel a man to take a Bar of Iron where he does not want one, for age does not improve it, and the buyer cannot be certain it will fit his future requirements. Patience, however, is a virtue to be cultivated, and blessed in these uncertain days is the concern that endureth to the end, however far away that goal may be. If the strike keeps up we look for more lively times in July on almost all classes of goods. Every few days we get a faint ripple of trade, a pleasant harbinger of the future wave. Hoops and Bands are not altogether slow. This is a special branch, and though one good mill in Pittsburgh is in operation, while all the rest are idle, it cannot alone meet the demand. Steel is quiet, though the quantity of best grades of Tool Steel going into actual consumption is indicative of a healthy condition of the smaller manufacturers, machinists, masons, contractors, miners, &c. Nails.—A good jobbing movement may be noted, but with none of that eagerness which was the noteworthy element in the January boom. Promise of heavy advances is apt to extract an incredulous smile from the average purchaser, so often has the effort proved futile. Steel Nails, however, are manifesting a very evident scarcity, and some of the factories are unable to do anything on the leading sizes. Building and improvements in our city are being conducted on a fairly liberal scale, so we take it that local consumption is up to the average. Wire is dull. Prices are strong enough at what they have ruled the last 60 days, but fence building is much less active. All the agricultural effort just now is being directed toward making crops. The development of Louisville as a tobacco market has been most gratifying. It is estimated reliably that the sales this year alone will aggregate 150,000 hogheads, and that the price paid will average not far from \$70 ½ hoghead. Nearly all of this tobacco is raised in Kentucky, and it may be seen at a glance what a source of wealth it is.

General trade is but moderate in its proportions. Cradles, Scythes and Forks have been running out in dribs, while the commoner grades of Builders' Hardware are finding their way into consumption. The Dayton Screw Company's unique list has been abandoned and now conforms to Russell & Erwin's, whose Latin motto apologizes for the new form of circular. They have followed the late advance, and we presume are willing to fill orders at it if the changed phraseology of the circular means anything. We hope it is an end of that sort of business where a price is quoted which, while extensively demoralizing, is in nowise binding. Extensive injury, with no promise of corresponding benefit, is unworthy of those who work it.

GEORGE H. HULL & Co., of Louisville, report to us as follows, under date of June 15, 1885: The market has been exceedingly dull for the past week, and very small sales have been booked. Regular grades continue firm in price, and although some concessions are offered on irregular grades, the concessions could not stimulate sales to any extent. We quote for cash in round lots as below:

FIG IRON.	
Southern Coke, No. 1 Foundry.....	\$16.50 @ 17.00
No. 2.....	15.50 @ 16.00
Hanging Rock Coke, No. 1 Foundry.....	16.00 @ 16.50
Hanging Rock Charcoal, No. 1 Foundry.....	21.00 @ 21.50
Southern Charcoal, No. 1 Foundry.....	18.00 @ 19.00
Silver Gray, different grades.....	14.00 @ 15.50
Southern Coke, No. 1 Mill, Neutral.....	13.25 @ 13.75
No. 2.....	12.25 @ 12.75
No. 1 "Cold-sh.".....	12.25 @ 12.75

Southern Charcoal, No. 1 Mill.....	16.00 @ 17.50
White and Mottled, different grades.....	12.00 @ 13.00
Southern Car-Wheel, standard brands.....	25.00 @ 26.00
Southern Car-Wheel, other brands.....	20.00 @ 22.00
Hanging Rock, Cold-blast.....	24.00 @ 25.00
Warm-blast.....	20.00 @ 21.00

Old Material.—The market for Scrap Iron continues very dull, and prices remain without change. We quote for cash in round lots as below:

Rails, ½ ton.....	\$16.50 @ \$17.00
Car-Wheels, ½ ton.....	18.75 @ 19.00
No. 1 Wrought, ½ ton.....	20.00 @ 21.00
No. 1 Cast, ½ ton.....	20.00 @ 21.00
Country Wrought, ½ ton.....	18.75 @ 19.00
Boilers, cut, ½ ton.....	18.75 @ 19.00
Boilers, uncut, ½ ton.....	18.75 @ 19.00
Axles, ½ ton.....	18.75 @ 19.00
Flues, Tanks and Sheets, ½ ton.....	18.75 @ 19.00
Burned Scrap, ½ ton.....	18.75 @ 19.00

Imports and Exports.

IMPORTS.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending June 16, 1885:

Hardware.	
Baker, Hermann & Co., Hardware, cutlery and guns, pkgs., 34	
Clanberg & F. A. Ironware, cs., 4	
Field Alfred & Co. Mdse., cs., 9	
Cash, 1	
Cases, 3	
Chms., cs., 9	
Gerdan Otto, Cases, 10	
Kress Oscar, Mach'y, pkgs., 26	
McCarthy & Hall T. Co. Case, 1	
Merch. Disp. Co. Arms, cs., 9	
Mach'y, pkgs., 11	
Gun, case, 1	
Reichard, Mach'y, cs., 8	
Ranborn & Co. Steelware, cs., 8	
Sellers Wm. B. Rods, bbls., 18,980	
Billets, 167	
Filditch Frank S. Cases, 2	
Bundles, 158	
Stralluck & Binger, Cases, 4	
Case, 1	
Sheldon G. W. & Co. Mach'y, cs., 30	
Star Theo. B. Case, 1	
Taylor Thos. Mdse., cs., 2	
Vom Cleff & Co. Chains, cs., 9	
Wieschup, Hilger & Co. Hdw. and cutlery, Cases, 64	
Vise, 1	
Chains, cs., 54	
Anvils, 155	
Witte, Wm. B. & Co. Iron, cs., 15	
Order, 1	
Machines, cs., 6	
Arms, cs., 10	
Mach'y, cs., 10	
Iron.	
Baring Bros. & Co. Nail rods, bbls., 3374	
Rods, coils, 10,754	
Swedish bars, 1294	
Bars, 5094	
Clinton Wire Cloth Co. Wire netting, bales, 47	
Coddington T. B. & Co. Sheets, bbls., 109	
Crocker Bros. Pig. tons, 800	
Pig. tons, 52	
Naylor & Co. Pig. tons, 250	
Cotton ties, bales, 13,300	
Neuhub & Co. Wirewood, coils, 345	
Ordnance Department, Forging, 1	
Pierion C. L. & Co. Spacer, plts., 30	
Revira J. de & Co. Ore, tons, 917	
Smith Geo. Wire plates, cs., 2	
Stetson Geo. W. & Co. Pig. tons, 300	
Wagner W. F. Bundles, 128	
Wagner, plts., Roelker, Mdse., pkgs., 6	

The imports of Cutlery, Hardware and Metals for the week ended June 12 were as follows:

Quantity.	Value.
Anvils.....	190 \$1,324
Antimony.....	170 1,214
Brass goods.....	14 728
Bronzes.....	30 1,468
Chains and anchors.....	38 1,761
Clocks.....	51 3,541
Copper.....	4,983 22,180
Cutlery.....	70 22,180
Gold ore.....	650 650
Guns.....	12 1,405
Hardware.....	12 1,370
Iron, pig. tons.....	2,372 51,520
Iron, sheet, tons.....	17 1,180
Iron, ore, tons.....	198 498
Iron, other, tons.....	288 12,917
Lead, pkgs.....	5,235 5,235
Machinery.....	70 2,742
Metal goods.....	308 37,333
Nails.....	6 506
Needles.....	17 8,079
Plates.....	2 11,005
Plated ware.....	9 694
Plumbago.....	861 10,117
Saddlery.....	11 1,847
Steel, cs.....	30,025 86,385
Steel blooms.....	1,085 1,978
Tin, boxes.....	53,198 213,988
Tin, slabs, 5,916; B.....	687,531 125,539
Clocks, case.....	211 2,626
Wire.....	400 3,067
Zinc oxide.....	1 11

The comparison for two years since January 1 is as follows:

34 weeks of 1885, time 1884.	Same time 1884.
Cutlery, pkgs.....	1,916 2,362
Hardware, pkgs.....	398 398
Iron, R. R. bars.....	11 9,422
Lead, pkgs.....	24,798 18,225
Steel, pkgs.....	920,586 670,191
Tin, bxs.....	868,398 865,891
Tin, slabs, B.....	7,392,557 7,919,810

EXPORTS.

The following list embraces the Exports of Hardware, Machinery, Iron, Metals, &c., from the Port of New York, for the week ending June 16, 1885:

Danish West Indies.	
Nails, cs.....	17 47
Ag. imp. pkgs.....	9 66
Mf. iron, pkgs.....	13 847
Clocks, case.....	1 10
Nails, kegs.....	38 75
Hdw., pkgs.....	6 52
Hamburg.	
Sew. ma., cs.....	988 16,843
Guns, cs.....	2 131
Mach'y, pkgs.....	9 2,480
Hdw., cs.....	355 4,360
Stamp ware, cs.....	4 135
Mach'y, pkgs.....	19 3,554
Bremen.	
Hdw., cs.....	18 681
Sew. ma., cs.....	2 65
Mach'y, pkgs.....	19 3,554

Cuba.	
Sew. ma., cs.....	29 798
Nails, kegs.....	265 595
Mach'y, pkgs.....	11 735
Pumps, pkgs.....	5 80
P. caps, case.....	1 110
Locomotive.....	1 770
Copper boiler.....	1 60
Clocks, cs.....	5 69
Saws, cs.....	3 104
Tin, cs.....	6 210
W. cloth, cs.....	2 84
Iron, bbls.....	5 29
Mf. iron, pkgs.....	776 9,099
Hdw., cs.....	8 624
Nails, pkgs.....	160 1,369
Scissors, cs.....	64 693
Cutlery, pkgs.....	36 1,094
M. dust, bbls.....	6 8
Tinware, cs.....	3 125
Cartridges, cs.....	1 125
Ag. imp. pkgs.....	9 172
Sandwich Islands.	
Hdw., pkgs.....	33 650
Iron, pkgs.....	65 100
Mf. iron, pkgs.....	50 200
Havre.	
Shafts, box.....	1 100
Ag. imp. pkgs.....	224 6,365
Pumps, pkgs.....	3 75
Copper, cs.....	180 25,000
Mach'y, pkgs.....	1 175
Copper, cakes.....	45 7,500
French West Indies.	
Tinware, cs.....	3 38
Sew. ma., cs.....	7 148
Porto Rico.	
Ag. imp. pkgs.....	12 227
Hdw., pkgs.....	6 130
Mexico.	
Nails, kegs.....	61 154
Cutlery, cs.....	13 132
Hdw., cs.....	69 1,332
Tinware, cs.....	3 130
Mach'y, pkgs.....	40 1,476
Saws, cs.....	4 83
Iron safes.....	5 195
Brass sheets, case.....	1 296
Revolvers, cs.....	2 538
Pumps, pkgs.....	2 686
Mf. iron, pkgs.....	263 1,804
Clocks, pkgs.....	7 248
Shot, kegs.....	2 48
Revolver, pkgs.....	41 685
Nails, pkgs.....	9 806
Sew. ma., cs.....	130 4,024
Windmill.....	1 125
Cartridges, cs.....	11 402
Carbines, case.....	1 140
Iron, pcs.....	134 110
Haiti.	
Hdw., pkgs.....	12 53
Iron, pkgs.....	13 41
Cot. gins, cs.....	2 108
Mf. iron, pkgs.....	7 98
Nails, kegs.....	4 46
Uruguay.	
Sew. ma., cs.....	50 750
Tinware, case.....	1 123
Pistols, case.....	1 123
Nails, cs.....	50 800
Ag. imp. pkgs.....	69 696
Iron safes.....	10 475
Ag. imp. pkgs.....	1 30
Cartridges, cs.....	9 304
Rifles, cs.....	50 6,400
Metal gds, cs.....	1 111
Clocks, pkgs.....	279 7,213
Mach'y, pkgs.....	1 155
S. rollers, cs.....	101 300
Safety pins, cs.....	2 115
Glasgow.	
Water wheels.....	2 1,100
S. rollers, cs.....	10 233
Sew. ma., cs.....	70 1

Trade Report.

General Hardware.

The features in the market that call for review are noted below, but the general situation remains practically unchanged since last week. The volume of trade continues moderate, most of the orders being for small assorted lots to meet present demand.

NAILS.

The market has been quiet, with very few large transactions on dock and a moderate business from store. We quote Iron Nails from store \$2.10 @ \$2.15, with the usual advance for Steel Nails.

In response to numerous inquiries we have compiled the following list of works in the East who make Steel Nails. It should be stated, however, that nearly all of them are at the same time producers of Iron Nails:

Pottstown Iron Company, Pottstown, Pa.
Charles L. Bailey & Co., Harrisburg, Pa.
Ellis & Lessig Steel and Iron Company, Limited, Pottstown, Pa.

Albany and Rensselaer Iron and Steel Company, Troy, N. Y.
Harrisburg Nail Works, Harrisburg, Pa.
Williamsport Iron and Nail Works, Williamsport, Pa.

The Danville Nail Mfg. Co., of Danville, Pa., have thus far made only a very few Steel Nails. At a meeting of the directors of the company it was resolved to submit to the stockholders, at a meeting to be held on the 10th of August, a proposition to increase the capital stock of the company by \$100,000. The company now have the drawings and estimates for a steel plant which it is proposed to erect during the summer.

The Weymouth Iron Company, of East Weymouth, Mass., make Steel Nails from Scrap Steel selected from their stock.

The following works report that they make Iron Nails exclusively:

Duncannon Iron Co., Philadelphia, Pa.
Fall River Iron Works, Fall River, Mass.
James Rowland & Co., Philadelphia, Pa.
Old Colony Iron Co., Taunton, Mass.
R. A. Bostley & Co., Taunton, Mass.
Reading Iron Works, Philadelphia, Pa.
Lewisburg Nail Works, Lewisburg, Pa.
Holidaysburg Iron & Nail Co., Holidaysburg, Pa.

BARB WIRE.

The market continues dull and shows indications of weakness. We quote 4.4 to 4.45 cents for carload lots of Four-Point Galvanized Barb Wire, and 4 1/2 to 4 3/4 cents for small lots. Large lines for export are quoted 4 cents, the lower price being due to the fact that a drawback of 90 per cent. is allowed on the duty on imported Wire Rods.

Messrs. Washburn & Moen Mfg. Co. and I. L. Elwood & Co. have, under date of June 15, issued the following circular to dealers in and consumers of Barb Wire:

We have had occasion within the past two years to issue various circulars in regard to our Barb-Wire litigation, and have taken great pains to inform dealers in and consumers of Barb Wire of our rights, and have even gone so far as to personally interview very many dealers throughout the West in regard to the danger they incurred in handling Barb Wire not manufactured under a license from us. Our efforts have been attended with a great measure of success, but some dealers professed no faith in our ability to sustain the Glidden patent, which has been in litigation for some time. For the satisfaction of those who placed reliance on our statements, and for the benefit of those who did not, we beg to submit certified copies of two decrees entered by Judge Brewer, of the United States Circuit Court for the Southern District of Iowa, under date of June 10—one against an unlicensed manufacturer, and the other against a dealer in unlicensed Wire. In these decrees it will be observed that the validity of the Glidden patent is declared, and also the infringement by these parties. The manufacturer is placed under heavy bonds pending the accounting of damages, and the dealer is peremptorily enjoined. We submit these decrees without further comment as the strongest vindication possible of our rights.

The following is the text of the decisions referred to, rendered by David J. Brewer, Judge of the Circuit Court of the United States, Southern District of Iowa, Central Division:

WASHBURN & MOEN MFG. CO. AND
ISAAC L. ELWOOD
vs.
J. B. HODGES AND J. E. ANDREWS.

In Equity.
No. 2,006.

This cause having come on to be heard on the bill of complaint, answer, replication, and the proofs taken in said cause, and having been argued by the counsel for the respective parties, and the court having duly considered the same, it is therefore ordered, adjudged and decreed by the court:

1. That the following Letters Patent of the United States, to-wit: Letters Patent No. 157,124, granted to Joseph F. Glidden November 24th, 1874, for an improvement in Barb Wire, is a good and valid patent.

That said Joseph F. Glidden was the first and original inventor of the improvements and inventions described and claimed in said Letters Patent No. 157,124, and that the complainants became and are vested with the exclusive right, title and interest in and to said letters patent, as in said bill of complaint alleged.

2. That said defendants, J. B. Hodges and J. E. Andrews, have infringed said Letters Patent No. 157,124, granted to said Joseph F. Glidden, by making and selling Barb Wire embodying the improve-

ments claimed in said letters patent, and that said defendants have violated and infringed upon the exclusive rights of the complainants secured to them by said letters patent in the manner set forth and described in the pleadings and proofs in this cause.

3. That said complainants are entitled to a discovery and accounting from said defendants of the gains and profits had and received by the defendants, and that the complainants recover the gains, profits and advantages which the said defendants have received, or which have accrued to the defendants for said infringement of said Letters Patent No. 157,124 by the manufacture, use or sale of the improvements described, and secured by said letters patent since the 24th day of November, 1874, and such further damage as the said complainants may have sustained by reason of such infringement.

4. That it be referred to P. T. Lomax, a master of this court, to take and report to the court an account of the gains, profits and advantages which the said defendants have received or which have accrued to the defendants since the 24th day of November, 1874, by infringing the said exclusive rights secured to the complainants by virtue of said Letters Patent No. 157,124, and also what additional damages the complainants have sustained by reason of such infringement. And said master is directed to take proofs and report the same, with his conclusions thereon; and he is hereby authorized to summon the defendants, their agents and employees before him, and to examine them on oath, and to require the defendants to produce their books of account touching the matters hereby referred; and the proofs already taken or used in this cause may be used on said reference, and such other testimony may be taken for use before the master as is authorized by law and by the rules of this court, as either party may desire.

5. It is hereby ordered, adjudged and decreed that said defendants, J. B. Hodges and J. E. Andrews, their successors or assigns, agents, attorneys and employees, be and they hereby are perpetually restrained and enjoined from making, using, selling or vending any Barb Wire Fence or Barb Wire Fence containing any of the said inventions described and claimed in said Letters Patent No. 157,124, during the life of said letters patent, and that an injunction issue accordingly. (Signed)

DAVID J. BREWER, Circuit Judge.

The second decision in the case of Washburn & Moen Mfg. Co. and Isaac L. Elwood vs. Grinnell Wire Company, Walter Rhodes and J. E. Rhodes is identical, so far as the four first counts are concerned, only the names of defendants being changed. Its conclusion, in which it differs from the first decision quoted, is as follows:

5. It is hereby ordered, adjudged and decreed that said defendants, Grinnell Wire Company, Walter Rhodes and J. E. Rhodes, their successors or assigns, agents, attorneys and employees, be and they hereby are perpetually restrained and enjoined from making, using, selling or vending any Barb Wire Fence or Barb Wire Fence containing any of the said inventions described and claimed in said Letters Patent No. 157,124, during the life of said letters patent, unless the said defendant, the Grinnell Wire Company, shall, within 20 days from the date of entering up this interlocutory decree, file in the clerk's office of this court, a true and correct account, under oath, of the number of pounds of Barb Wire Fence which they have manufactured and sold, of the style of Wire introduced in evidence in this cause, since the 13th day of May, 1885, up to this date, and shall thereafter, on or before the 10th day of each calendar month, and until the entering of the final decree in this cause, file in said clerk's office, a true account, under oath, of the number of pounds of Barb Wire Fence which they have manufactured and sold during the month preceding, and shall also pay into court, upon the filing of said accounts, and each of them, a sum of money equal to 15 cents for each and every 100 pounds of Barb Wire Fence shown to be manufactured and sold by such reports; and unless, further, the said defendants shall, within said 20 days, file a bond in the penal sum of \$50,000, with at least two good and sufficient sureties, to be approved by the clerk of this court, conditioned for the payment into court, for the benefit of the plaintiff, upon the entry of the final decree in this cause, such sum as shall be found by the court to be due from the defendants, or either of them, to the complainants.

And it is also further ordered that, until the entry of the final decree, the said defendants, and each of them, be and they are hereby restrained and enjoined from increasing the number of Barb Wire machines in their factory or elsewhere operated by them, or either of them, and from enlarging the manufacture of Wire above the amount heretofore manufactured.

And the court reserves to itself the right to modify the terms of this decree at any time before the entry of the final decree, and to make the injunction absolute, if it shall appear that justice so requires.

(Signed) DAVID J. BREWER, Circuit Judge.

Same decree entered in the case of Washburn & Moen Mfg. Co. and Isaac L. Elwood vs. Farmers' Protective Association and William L. Carpenter.

The Grinnell Wire Company, of Grinnell, Iowa, have issued the following circular, under date of June 11:

Yesterday Judge Brewer entered an interlocutory decree in the Glidden Wire patent case, allowing us to continue the manufacture of Barb Wire, the same as heretofore; also allowing us to deposit a bond of \$50,000 to cover any judgment that may be rendered on final decree, and requiring us to deposit a royalty of 15 cents per 100 pounds on all Wire manufactured after May 13, 1885. The case will now go to the Supreme Court for final determination. This order protects you fully from any liability whatever for past damages, and places your Wire for the future on the same basis as any other licensed Wire. Washburn & Moen cannot collect a cent from you. We will now fill

your orders promptly, and wish to return many thanks for your patience and confidence in the past, and trust that we shall be favored with your patronage in the future.

LOCKS.

The Lock Association, which was in session when we went to press last week, advanced the quotation on Locks 5 per cent., making the price discount 66 2/3 and 2 per cent. for cash.

Referring to this change the Nimick & Brittan Mfg. Co., Pittsburgh, Pa., issue the following Discount Sheet No. 6, which bears date June 10, there being, it will be understood, the additional cash discount of 2 per cent.:

	Dis. per cent.
Door Locks, Knobs, Latches, Keys, Escutcheons and Bell Pulls.....	66 2/3
Padlocks and Padlock Keys.....	66 2/3
Butts, Genuine Bronze.....	50
Butts, Egyptian Bronze.....	50
Butts, Bronze Plated.....	50
Lever Bell Pulls.....	50
Sash Locks.....	50
Store Door Handles, Locks and Latches.....	50
Miscellaneous Genuine Bronze Goods.....	50
Miscellaneous Egyptian Bronze and Bronze Plated Goods.....	50
Scales.....	50

It is also announced that on all purchases of Locks, Knobs, Latches, Keys, Escutcheons and Bell Pulls amounting to \$500 net during season ending December 31, 1885, a special quantity discount of 5 per cent. will be allowed, and that on all purchases of 50 dozen Padlocks at one time a special discount of 5 per cent. will also be given. The circular also contains the following revised list prices of Door Locks and Latches and Door Knobs, which have been changed since the issue of their January 1st list:

Door Locks and Latches.					
Nos.	31	32	34	0221	0222
Per doz.	\$2.95	3.00	3.90	3.90	5.15
Nos.	226	0401	401	0402	406
Per doz.	\$5.85	4.35	5.15	6.35	6.35
Nos.	0701	0721	01001	01051	01052
Per doz.	\$2.95	3.00	1.00	3.90	5.15
Nos.	1056	01063	1067	01072	1076
Per doz.	\$5.85	9.75	9.75	10.75	10.75
Nos.	1073	1057	22X	22G	22C
Per doz.	\$11.75	11.70	10.00	10.60	18.70

Door Knobs.			
Nos.	100	101	110
Per doz.	\$2.55	2.55	3.15

Some of the other manufacturers have also sent out circulars announcing the new discounts on Locks, Knobs, &c.

SCREWS.

There has been no change in the general aspect of the market since our last report, quotations remaining as before, with a moderate trade. There is still, our readers will understand, considerable divergence in the prices of the different makers, and this, with the two lists now in use, causes some irregularity and uncertainty. But, while prices thus remain as at our last writing, it will interest the trade to learn that the Russell & Erwin Mfg. Co. have bought out the Syracuse Screw Works, Syracuse, N. Y., purchasing all their machinery, tools, &c., used in the manufacture of Screws, Tire Bolts and Stove Bolts. The Screw machinery will be removed by the Russell & Erwin Mfg. Co. to Dayton, Ohio, where it will be added to the plant of the Dayton Screw Company, and the Bolt machinery to the factory at New Britain, Conn.

AMMUNITION.

The recent reduction in the price of Ammunition is attracting much attention with the trade, and dealers in this line are sending out announcements and circulars in regard to the new prices and the present condition of the market. The following, bearing date June 6, has been issued by Edw. K. Tryon, Jr., & Co., Philadelphia, and will be of interest to our readers as giving the new discounts on some lines which were not specified in the association circular which we printed last week:

Discount from Company's List Prices.	
Rim Fire Cartridges.....	60&10
Central Fire Pistol Cartridges.....	40&10
Central Fire Sporting and Military Cartridges.....	30&10
Blank Cartridges, 22 Caliber, per 1000, net.....	\$1.50
Blank Cartridges, 32 Caliber, per 1000, net.....	\$1.00
Blank Cartridges, all other sizes, 10 per cent. less than Ball Cartridges.....	
Paper Shells, first and second quality.....	25&5
Paper Shells, Rival and XX quality.....	45&5
Paper Shells, Star quality.....	50&5
Primed Shells and Bullets.....	25&10
Felt Wads, all qualities.....	30
Card-Board Wads.....	20
Berdan, Wesson & Winchester Brass Shells.....	60&10
Keystone Brass Shells.....	60&10&5
Eureka.....	60&10&5
Sturtevant.....	60&10
Brass Shells, Rival and XX quality.....	60&10
Saloon Caps, per 1000, net.....	\$1.45
Saloon Caps, Conical Ball, per 1000, net.....	1.60
Keystone Wads, 10 and 12 ga., per doz., net.....	.60
Winchester Primers, all sizes, per 1000, net.....	1.00
Berdan Primers, all sizes, per 1000, net.....	.25
Sturtevant Primers or B. L. Caps, per 1000, net.....	.35

It is then stated that an extra discount will be given on all Ammunition ordered in case lots, with special prices for large orders. These prices given above are stated to be subject to change without notice, and orders will be filled at prices ruling at the time of their reception. The intimation also is given that the house issuing the circular proposes to meet competition.

Joseph C. Grubb & Co., Philadelphia, also issue a postal card in which they say that, owing to the break in prices on American Ammunition, Metallic Cartridges, Paper and Brass Shells, &c., they desire to advise their friends that they will guarantee them the lowest market prices, subject to change without notice.

The following discount sheet has been issued by the

SANDUSKY TOOL COMPANY, as applying to their catalogue of 1885, to which we referred last week. It will be of interest as showing the line of goods represented, and the prices at which they are regularly quoted. The discounts given are subject to an additional 2 per cent. for cash in 10 days:

	Dis. per cent.
Bench Planes, 1st grade, stamped Sandusky Tool Company.....	20

Bench Planes, 2d grade, stamped Ogonts Tool Company.....	25
"Fancy Planes, all kinds.....	15
Morris Patent Non Planes.....	40
"Plane Irons, all kinds.....	20
German Pattern, Handled, Hoes.....	50&10
Solid Steel Plaster's Hoes.....	50&10
Solid Steel Scovill Pattern Hoes.....	50&10
Brad Awhs and Tools.....	60&10
Gauges.....	35
Saw Handles.....	20
Plane Handles.....	20
Chalk Line Reels.....	25&10
Bench Screws.....	35
Tail Screws.....	25
File Handles.....	25&10
Brad Awh Handles.....	25&10
Auger Handles.....	20
Cross-Cut Saw Handles.....	35&10
Hand Screws.....	15&5
Cabinet Lamps.....	25&10
Rolling Pins.....	30
Reef Mails.....	30
Potato Mashers.....	30
Coopers' Tools and Joiners.....	20
Coopers' Drivers.....	20
Truss Hoops, Nos. 1, 2 and 3.....	30
Froes (superior quality only).....	25
Mallets (except Iron Ring Mallets).....	15&10
Round Iron Ring Mallets, Nos. 15 and 17.....	15&10
Bunge Stakers.....	25&10

The discounts on goods marked * are those of the Plane Makers' Association.

THE UNITED BRASS COMPANY,

whose general office and warehouse is at 79 Fulton street and 54 Gold street, New York, with works at Lorain, Ohio, and Haydenville, Mass., in addition to their Hardware catalogue, to which we directed attention several months ago, have issued a Plumber's catalogue, showing the line of goods which they make for this trade. It is a handsome volume of 400 pages, printed in black and red, and representing a very complete line of goods. It contains a detailed index which is convenient for use, and also a "short index," which, omitting the pages, will indicate the range of goods covered by the catalogue:

Bronze Work;
Chain Stays;
Compression Basin and Shampooing Cocks;
Compression Bibbs;
Compression Double Bath Cocks;
Compression Hydrant Cocks and Ball Cocks;
Compression Sill and Urinal Cocks;
Compression Stops and Hopper Cocks;
Corporation Stops;
Ground Key Basin and Shampooing Cocks;
Ground Key Bibbs;
Ground Key Stops, Hydrant and Hopper Cocks.
Hardware Goods.
Self-Closing Work.
Street Washers and Hydrants.
Miscellaneous Goods.
Peck's Improved Work.
Pumps.

It contains also a full and satisfactory code for correspondence. In their introductory remarks, among other matters they say that unless otherwise specified they consider regular and will ship on orders for water-work Lead-Pipe goods; Ground Key Work, unless otherwise specified; Finished Stops, when Stops are ordered, and Silver Plated when Plated is called for (not Nickel); Finished Bibbs and Stops will be sent when not otherwise specified. In Hardware goods they will ship Tinned End or Drive Shank, unless the order calls for Screw Shank.

Some idea of the variety of goods in this line manufactured and sold by the United Brass Company may be formed from the fact that each of the 300 and odd pages contains two or more cuts of articles, most of which are supplied in a number of different sizes and finish. The cuts in the majority of instances show perspective views of the articles, though some few goods, such as Moore's Patent Self-Closing Faucet, are illustrated with sectional views which show their special construction and method of working. Throughout the book, below the price of each article is printed the corresponding code word in red ink. This method of arrangement will be appreciated as saving time and trouble where goods are ordered by telegraph. The contrast in the colors of the ink brings the code words prominently before the eye and lessens the danger of mistakes. The United Brass Company are Brass founder, and manufacturers of every variety of Brass Work for plumbers, steam and gas fitters, including Pumps, Water-closets and Tools. Their works at Lorain, Ohio, and Haydenville, Mass., of which illustrations are given, are complete plants, comprising foundries, finishing shops, &c. The Haydenville works are operated by the Haydenville Mfg. Co., and, besides Brass Goods, manufacture Iron Goods for water, gas and steam. Besides the code words distributed throughout the catalogue, an extensive correspondence code is printed in the first part of the book, covering all the ordinary questions and answers that it is desirable to send by telegraph. The general arrangement and appearance of this catalogue is creditable to the large house who issue it, while its extensive and well-arranged contents will render it of much value to those whose business relates to this class of goods.

HERMANN BOKER & CO.,

101 and 103 Duane street, New York, are sending out a new price list showing the line of American and Foreign Hardware, Cutlery and Guns of which they are manufacturers or importers. It is a considerable enlargement on their last catalogue and is rearranged, an effort being made to classify the goods more conveniently for the use of the trade. It refers prominently to the goods of the Trenton Vise and Tool Works, Trenton, N. J., of which the firm are the proprietors, and mentions the following houses for which they are sole agents. R. Heinisch's Sons, Newark, N. J.; Ward & Payne, Sheffield, England, and S. J. Addis, London. The first part of the book is devoted to German

goods, including Chain, Grass Hooks, Seythes, Bits, Compasses, Pliers and a large variety of miscellaneous goods. After H. Boker's and Ward & Payne's Sheep Shears comes the department devoted to Cutlery, and covering Barlow Knives, Hunting and Bowie Knives, Razors—Gardner, Trenton, Wostenholm, Wade & Butcher and others—and John Wilson's goods. Butcher's Files, Chisels and Plane Irons are also represented, with Hedge Shears, Trowels, Chatterman's Tapes, &c. Their Gun department is more fully represented than in any previous catalogue, and they invite special attention to the line of English and Belgian Breech and Muzzle Loading Guns, Gun Material, Caps, Wads, Shells, &c. The "International," which are referred to as the latest improved machine made Guns, with parts interchangeable, are prominently represented as a leading line. R. Heinisch's Sons' Shears are illustrated, and also their Sheep Shears, which were not contained in the former catalogue. The "Trenton" brand Shears and Scissors are also now represented in the list for the first time. The catalogue closes with the goods of the Trenton Tool and Vise Works, covering Solid Box, Cast Parallel, Swivel, Coach, Rapid Transit Parallel and Coach Vises, and Picks, Mattocks, Grub Hoes, Hammers, Sledges, &c. The list is very neatly printed and uniform in style with their last, which it supersedes.

C. E. JENNINGS & CO.,

69 Reade and 87 Chambers streets, New York, have just issued a new and enlarged illustrated catalogue of their line of Mechanics' Tools and Hardware Specialties. It bears date June 1, 1885, and represents the goods of which they are the well-known manufacturers, with a number of recent additions. The catalogue, which is a large-paged and fully illustrated pamphlet of 110 pages, opens with Augers and Bits, comprising the L'Hommedieu and Watrous Ship Augers and Bits and C. E. Jennings & Co.'s Augers and Bits in full variety. Special attention is directed to the Auger Bits put up in fancy boxes with rack to hold one Auger Bit of each size, which are offered in five different assortments. Their No. 5 Round Extension Lip Auger Bit is shown on page 14. The spurs of this Bit are described as cutting the hole smoothly, and the beveled lip and draw cut as enabling it to bore easily and without forcing. After the exhibit of other Boring Implements, the Merrill & Wilder Chisels and Drawing Knives are represented. Their Socket Firmer Chisels in sets and in fancy wooden boxes are prominently shown as a line in which there is a satisfactory and increasing demand. These sets, which are designated as No. 10, contain 12 Chisels from 1/2 to 2 inches, sharpened and set ready for use, and fully warranted. Robinson's Patent Draw Shaves, a new article, a description of which we give on page 33 are also represented. The Levels of the Davis Level and Tool Company follow, with an illustration of the Four-bladed Gun Screw Driver and other specialties. We then come to Shephardson's Bits, Gimlets, Screw Driver Bits, Reamers, &c., and a regular line of Screw Drivers, some novelties in which are represented on page 46. The Clark Tool Company's goods comprise a large variety of small Tools, Countersinks, Punches, Gimlets, Compasses, Callipers, Spring Punches, Box Chisels, Sawsets, &c., and Bench Hooks, Spoke Trimmers, Trowels, Hatchets, Hammers, &c. The L'Hommedieu Patent Table Cutlery in enlarged variety is represented on page 89, followed by Carvers, Britannia Tea and Table Spoons and Shears. Griffin's Patent Hack Saws are illustrated, and also the Butcher Saw, which is made on the same principle as Hack Saw No. 30. Griffin's Piercing or Jeweler's Saws, with plain or nickel-plated frames, are also illustrated. After other miscellaneous goods comes a line of Handles made at the Jennings & Griffin Mfg. Co.'s factory, comprising Chisel, File, Brad Awh and Screw Driver Handles. The list closes with the Clark Tool Company's Brad Awhs and Tools, Giant Hollow Handles and Tool Chests. The following discount sheet applies to the catalogue, there being an additional discount of 10 per cent. for net cash in 30 days:

	Discount.
Ship Augers.....	10
Bridge Builders' Augers.....	10
Dock Builders' Augers.....	10
Railroad Augers.....	10
Ship Auger Bits.....	10
Ship Auger Pattern Car Bits.....	10
Tread Augers.....	10
Scotch Pattern Augers.....	10
Extra Boring Machine Augers.....	50&10
No. 1 Boring Machine Augers.....	50&10&5
Single Twist Boring Machine Augers.....	50&10
Extra Carpenters' Augers.....	50&10&5
No. 1 Carpenters' Augers.....	50&10&5
Black Carpenters' Augers.....	60&5
Gas Fitters' Augers.....	30
Raffing Augers.....	40&10
Millwright Augers.....	40&10
C. E. J. & Co.'s Bright Cuban Augers.....	45
Clark's Bright Cuban Augers.....	45
Bonney's Hollow Augers.....	40
New and Old Pattern Hollow Augers.....	35
Auger Bits, in Fancy Boxes.....	10
C. E. J. & Co.'s Extra Auger Bits.....	50&10
Clark's Extra Auger Bits.....	50&10&5
Clark's No. 1 Auger Bits.....	50&10&10
Clark's Extension Lip Auger Bits.....	50
C. E. J. & Co.'s Round Lip Auger Bits.....	40&10
Watrous Extension Lip Auger Bits.....	40&10
Solid Head Auger Bits.....	35
Dowel Bits.....	40
Cooper's Dowel Bits.....	50&10
Plug Bits.....	15 cents net per quarter
Double Spur Pattern Car Bits.....	50
Solid Head Pattern Car Bits.....	50
Handled Auger Bits.....	40
Clark's Expansive Bits.....	45
Steen's Expansive Bits.....	45
Auger Handles.....	30&5
Brace and Bit Sets.....	40
Sieve Braces.....	50&10
Hatchet Braces.....	50&10
Lamp Braces.....	50&10
Ball Braces.....	50

Boring Machines.....	45
Merrill & Wilder's	
Socket Firmer Chisel Sets, No. 10, in Fancy	35
Boxes.....	60
Socket Firmer Chisels, No. 10.....	60
Socket Firmer Chisels, No. 5.....	70
Coach Makers' Chisels.....	25
Paring and Millwrights' Chisels.....	25
Carpenters' Slicks.....	25
Socket Framing Chisels, Nos. 10 and 30.....	60
Socket Framing Chisels, No. 5.....	70
Corner Chisels.....	60
Socket Firmer Gauges.....	25
Drawing Knives.....	60
Drawing Knives, stamped Hinsdale Mfg. Co.....	70
Robinson's Draw Shaves.....	25
Watrous's Adjustable Drawing Knives.....	15
Davis's Inclinerometers.....	10
Davis's Levels and Level Glasses.....	10
Davis's Pocket Levels.....	10
Davis's Hack Saws.....	20
Davis's Hack Saw Blades.....	30
Davis's Screw Drivers.....	30
Davis's Calipers.....	30
Davis's Center Squares and Awns.....	30
Davis's Gauges, Planer Jacks and Planes.....	30
Breast Drills and Rules.....	30
Chucks.....	40
Miter Boxes.....	30
Hand Drills.....	30
Hartwell's Bits, all sizes.....	\$6.50 gross, net
Other Goods.....	30
Shenardson's Glimlets.....	30
Hartwell's Glimlets.....	\$6.50 gross, net
Shepardson's Small Tools.....	30
Shepardson's Bits and Countersinks.....	30
Shepardson's Screw Drivers.....	30
Clark Tool Company's Screw Drivers.....	30
Sewing Machine and "Eureka" Screw Drivers.....	30
"Telescope" Screw Drivers.....	30
Clark's Screw Driver Sets.....	30
Double Cut Bits.....	40
C. E. J. & Co.'s Bits.....	40
C. E. J. & Co.'s German Pattern Bits.....	40
Center Bits.....	10
Other Bits.....	40
Pod and Countersink Bits.....	40
Screw and No. 10 Screw Bits.....	40
Screw Driver Bits.....	40
Nail Sets and Reamers.....	30
Clark Tool Company's Countersinks.....	10
Solid and Prick Punches.....	30
Clark Tool Company's.....	30
Nail and Spike Glimlets.....	30
"Eureka" Nail Glimlets.....	30
Wood Head Nail Glimlets.....	40
C. E. J. & Co.'s "Star" Glimlets.....	40
Clark's Pod Glimlets.....	40
Clark's Double Cut Glimlets.....	40
Barber's Countersinks.....	10
Clark Tool Company's Compasses, Dividers and	
Calipers.....	60
Clark Tool Company's.....	60
Saddler's Punches.....	30
Spring and Revolving Punches.....	50
Fluting Scissors and Pinching Irons.....	30
Pinching Irons.....	30
Gas Flyers.....	30
Box Chisels.....	30
Cigar Box Openers.....	30
Cold Chisels.....	15
Plumbers' Saws.....	40
Oyster Knives, New York Pattern.....	30
Oyster Knives, Boston and California Pat-	
tern.....	10
Rivet Sets.....	30
Saw Sets.....	30
Saw Sets, Hammer.....	30
Keller Saw Sets.....	30
Wardrobe Hooks.....	30
Socket and Screw Awns.....	30
Clark Tool Company's.....	30
Brad Awn Blades.....	30
Handed Brad. Scratch and Belt Awns.....	30
Cotton and Box Hooks.....	30
Ship Scrapers.....	30
Box Scrapers, No. 5.....	30
Box Scrapers, other Nos.....	40
Washer Cutters.....	30
Weston's Pattern Bench Hooks.....	30
Clark Tool Company's.....	30
Spoke Trimmers.....	30
Spoke Shaves.....	30
Hick and Pointing Trowels.....	30
Saw Pads.....	30
Bung Boreas.....	30
Smith's Shingling and Claw Hatchets.....	40
Howard & Co.'s Hatchets.....	40
Clark Tool Company's.....	50
Hatchets.....	50
Handled Axes.....	30
Carpenters' Nail Hammers.....	30
Upholsterers' Hammers.....	30
Tack Hammers.....	30
Diagonal Wrenches.....	30
Hayden's Pocket Wrenches.....	30
Remington's Socket Wrenches.....	30
Steer's Adjustable Planes.....	30
Sleekley's Planes.....	30
Popping's Planes.....	30
Smith's Mincing Knives.....	30
Clark's Patent Stair Grieths.....	30
Tack Claws, Cake Turners and Kitchen Forks.....	30
Lemon Squeezers.....	30
Carpet Stretchers.....	30
Ice Chisels.....	60
Ice Cutters.....	40
Clark Tool Company's.....	30
Ice Tools.....	30
Picks and Cork Screws.....	30
Patent Cork Screws.....	30
Ordinary Cork Screws.....	30
Carpet Whips.....	30
Clark Tool Company's.....	30
Can Openers, Nos. 10 and 15.....	70
Can Openers, other numbers.....	50
Sardine Scissors.....	50
L'Hommeed Cutlery.....	30
New England Cutlery.....	30
Carvers and Bread Knives.....	30
Britannia Tea and Table Spoons.....	60
American Cast Steel Shears and Scissors.....	60
Maroon.....	60
American Cast Steel Shears and Scissors, Plated.....	70
Etna Cast Steel Shears and Scissors.....	70
American Cast Iron Shears and Scissors.....	70
Griffin's Hack Saws, Nos. 30 and 35.....	40
Griffin's Butcher Saws, No. 30.....	40
Clark's Butcher Saws.....	30
Clark's Meat Saws.....	30
Clark's Saw Knives.....	30
Clark's Key Hole Saws and Blades.....	30
Clark's Compass Saws.....	30
Griffin's Jeweler's Saws.....	30
Griffin's Jeweler's Saw Blades.....	30
Clark's Farmer's Hand Saws.....	30
Clark's Combination Saws.....	30
Clark's Prunz Saws.....	30
Blacksmith's Bellows.....	30
Hand and Molders' Bellows.....	30
Belt Hooks.....	70
Spring Cutters.....	50
Roller Skate Cutters.....	50
Spring Keys.....	50
Chisel Handles.....	50
File Handles.....	50
Brad Awn Handles.....	50
Screw Driver Handles.....	50
Bench Drivers.....	45
Hand Screws.....	45
Jack Screws.....	50
Jail Locks, Loose Shackles.....	50
Jail Locks, Fast Shackles.....	50
Brad Awns and Tool Sets.....	50
Giant Hollow Handles.....	10
Boy's Bit Brace and Tools.....	30
Tool Chests.....	40

the delightfully large and clear type in which the list prices are printed.

ITEMS.

A. Alford, the president of the Alford & Berkele Company, 77 Chambers street, New York, has compiled an illustrated pocket catalogue of the Cutlery of the Goodell Company, for which they are agents, with comparative list of prices and numbers, which shows at a glance the corresponding numbers of the other manufacturers with the list price. This comparative table is not intended to be exhaustive, but comprises the leading numbers, and will be of service to those who desire to know the numbers of the Goodell or other goods which they may desire to substitute for the make with which they are most familiar. The list of the Goodell Company, which is given, is that to which we have already directed the attention of the trade, and is fully illustrated, showing the variety of patterns of which they are the manufacturers. The book comes to us in very attractive form. It should be borne in mind, however, that it is not printed for general distribution, but exclusively for the buyers of wholesale Hardware and Cutlery houses, by whom it will be appreciated.

Dame, Stoddard & Kendall, Boston, in their announcement on page 36, call attention to Forbes's Patent Acme Cub Skate as the original and only genuine Acme Ice Skate, which is manufactured by the Star Mfg. Co., Halifax, for which they are the sole selling agents for the United States.

Announcement is made May 26 by Chas. J. E. Thompson, Providence, R. I., that he has sold his stock of Patent Connecting Links, together with his patterns and tools, to W. & J. Tiebout, 16 and 18 Chambers street, who in turn state, referring to the above announcement, that they have on hand and intend to manufacture and keep in stock a full line of Thompson's Patent Links, made from the original patterns.

The Sun Vapor Light and Stove Company, Canton, Ohio, of whose Burner we gave a description in our last issue, send out a price list of Fixtures, including Chandeliers, Stand Lights, Pendants, Brackets and miscellaneous attachments. All their Burners and Fixtures, it is stated, are made to use 74° or 76° deodorized gasoline, and all Portable Fixtures are provided with safety gauge.

Among the special notices on page 22 is one in which Smart & Shepherd, Brockville, Ontario, offer for sale their Hardware manufacturing business. The announcement alludes to the reason which induces the proposed sale, and gives particulars which may be of interest to manufacturers as relating to a favorable opportunity to open branch works from which to supply the Canada market. The catalogue of the advertisers shows that they are manufacturers of Latches, Door Handles, Coat and Hat Hooks, &c., Brackets, Blind and Gate Hinges, &c., and a variety of specialties.

Gummeys, Spring, Ingram & Co., Philadelphia, send us the following announcement to the trade:

Having been advised that certain parties claiming to be agents of one of our competitors in the Tin Shingle manufacturing business stated to our customers that their principals had commenced suit against us for infringement, we desire to inform the trade that such statements are deliberate falsehoods, and are simply made to intimidate and deter them from using or handling the "Patton" Metallic Shingle, the superior merits of which are manifest to the most casual observer. In each and every instance where any attempt is made to interfere with our business by such means, if the party so approached will kindly forward to us an affidavit, duly certified, setting forth the facts, the Patton Metallic Shingle Company will prosecute the principals to the full extent of the law.

Green Wire Cloth is firmer in this market than it has been, owing to a scarcity at the present time from the animated demand and reduced supply.

The impression seems to prevail that before long there will be another change in the price of Tacks, and in anticipation of it some of the outside makers are giving somewhat lower prices on the goods.

Files, as the trade are well aware, have long been in an exceedingly unsatisfactory condition, especially as regards the profits of the manufacturers. They have undoubtedly in many cases been selling very close to cost. The manufacturers are, however, consulting with reference to the situation and are making efforts to come to some kind of an agreement by which some regularity may be given to prices. The movement has not yet assumed definite shape, and there are uncertainties and difficulties in the way which leave it a question what the outcome will be.

A correspondent writes inquiring for the address of the manufacturer of the "Faultless" Door Hanger, information which perhaps some of our readers can furnish.

Wrought Brass Butts are held firmly by the manufacturers at the recent advance, but sales are frequently made by the jobbers at somewhat reduced prices, presumably from old stocks which were purchased at the late low figures.

The Hoosier Handle Company, Metamora, Ind., successors to the William Roy Mfg. Co., and manufacturers of a full line of Axe, Adze, Pick, Sledge, Hatchet and Hammer Handles, have appointed T. P. Burke, 100 Chambers street, their general agent, who will be prepared at all times to name the factory's bottom prices. This is spoken of as practically a new concern, starting with a

paid up capital of \$200,000 and proposing to make first-class goods.

Hibbard, Spencer, Bartlett & Co., Chicago, issue a 54-page supplement to their 1883 catalogue. It is fully illustrated, and will be of interest to the trade as giving information in regard to lines which they have since then added to their assortment. The last six pages are devoted to changes in lists which have occurred since the publication of their catalogue. They also send out a 36-page pamphlet devoted to Bird Cages, Wire Cloth, Screen Doors and other similar seasonal goods.

Our readers will be interested to learn that Alfred Field & Co., 93 Chambers street, New York, have received notice from the New Orleans exposition that they have been awarded a gold medal as highest award for best Concave Razors, Pocket Knives and Scissors.

S. H. & E. Y. Moore, 163 Lake street, Chicago, have withdrawn from the General Hardware business, to devote themselves exclusively to the manufacture and sale of Hardware specialties, a business in which, as our readers are aware, they have been largely engaged for some years.

Announcement is made by Hobson, Benson & Co., Raritan, N. J., under date June 8, that, having purchased the manufacturing property known as the Raritan Agricultural Works, they will continue to operate them in manufacturing the Raritan Mowing Machines, Steam, Horse and Hand Power Corn Shellers, Threshing Machinery, Grain Drills, the Raritan Horse Hay Rake, Land Rollers, Cultivators, Feed Cutters, Horse Powers and Agricultural Implements generally; also Gray Iron Castings of every description.

The Henderson & Harker Mfg. Co., Columbus, Ohio, having purchased the interests in the patents, property and good-will of the Columbus Elbow Company, announce that, with increased capital and capacity, they will continue to manufacture "Columbus O. K." Stove Pipe Elbows, "King" and "Standard" Glass Oil Cans, National Tin Safety Oil Cans, "King" (force pump) Oil Tanks and National Oil Tanks, and have added to their line Kerosene Lamp Fixtures, Gas Soldering Furnaces, with a variety of Hardware specialties.

Hibbard, Spencer, Bartlett & Co., Chicago, under date June 9, issue the following announcement with reference to the Nail market:

Owing to the closing of all Pittsburgh, Wheeling and Western Nails Mills by the strike of the employees, the stocks of many manufacturers are already broken, and should the strike continue Nails will soon be very scarce. We have a large stock from which we shall supply our customers as long as it holds out at the lowest market prices on the date of shipment.

Thomas Devlin & Co., Philadelphia, Pa., have issued their 1885 price list and catalogue, showing the line of goods which they manufacture. It covers a line of Cast Butts, Spring Hinges, Gate Hinges, Hangers, Latches, Hat, Coat and Harness Hooks, &c., with a variety of other goods which has been considerably increased since the issue of their last list.

WHAT THE TRADE SAY.

As relating to the general subject of the relations between manufacturers and jobbers, we have the following suggestive communication from a house whose views are entitled to weight:

It is to us as though there was an "irrepressible conflict" coming between manufacturers and jobbers, in which the jobbers are bound to get the worst of it, for in many lines they are now useless, and I do not see why they will not in the end become so in all. We may be mistaken in this, and, if the demand for goods catches up with the supply, we probably are. We have always tried to get goods as near to the manufacturer as possible, but six or eight years ago we often could not do so except at jobbers' price, but we have no trouble now. We think manufacturers are at this time establishing relations with the retail trade that they will very reluctantly break up in the future, and in this day of railroads, telegraph and telephones it will go out of fashion to stop goods half-way merely to advance the price. We acknowledge that we are prejudiced, and may be mistaken, but it looks this way to us.

We are in receipt frequently of intimations from the trade that the existing demoralization in prices results to a greater or less extent from the cutting by some large houses who are presumed to purchase at lower figures than their competitors. The impression seems to be that these very large jobbing houses, on account of the amount of goods they purchase, are enabled to get extra discounts beyond what are generally called the bottom prices, so that they are enabled to undersell the smaller jobbers and still make a profit. The correspondent whose letter we give below evidently views things in this light and refers to what seems to him the lack of wisdom in manufacturers in thus putting these largest jobbing houses in a position to break the market. His views, which will be of interest, are as follows:

To the Editor of The Iron Age: Allow me a word in regard to cutting of prices. In the first place, natural causes are partly responsible for this condition of things. In the next place, manufacturers themselves are responsible for three quarters of it. Forgetting that their wares are better distributed when in the hands of many interested in properly placing goods, they name their prices to jobbers as bottom, reserving an extra confidential discount to, say, half-a-dozen large houses on account of quantity, thus pursuing a plainly suicidal policy, and

for this reason: These large houses say, Why cannot we place these goods at what they cost our smaller competitors, reserving the extra 5 per cent. as our profit, and thus shut out our small-fry competition and have the field to ourselves? The consequence of this is that the smaller dealers lose interest in the goods, talk and work against them and take to goods offered by other manufacturers. Then come these half-a-dozen largest jobbers, who say to the makers: We can make no money on your goods; you have no outlet for them except through us; we must have another extra 5 per cent. Forced to grant this, the concession is made, and, other makers being forced into the whirlpool, the cut goes on. There is but one way out of this. Shut out extra discounts to a few large jobbers who want to hog the trade, and who give away every extra and demoralize the market. They force the small trade to the wall, and the manufacturers are accessories to their own downfall. This is the great lever of demoralization in prices, in

MY OPINION.

St. Louis.

ST. LOUIS, Mo., June 15, 1885.

Speculation as to the continuation of the strike and the effects of the same have, of course, been the chief items of interest during the past week. As most of the supply of Merchant Iron comes from Pittsburgh and vicinity, all that affects the mills of that locality is regarded with lively interest here. Of course it is too early to comprehend all of the effects of the strike, but the impression prevails that there will be enough Merchant Iron made to prevent any extraordinary advance in price. No doubt Steel will have another opportunity to supplant Iron for numerous uses should the prices of the latter advance materially. All of the mills in this vicinity seem to have expected stoppage, and one of the busiest anticipated the strike by shutting down.

After receiving the full text of Judge Brewer's decision and consulting with lawyers, several of the largest "moonshine" manufacturers again began the manufacture of Barbed Wire. It appears that suits against them involve other patents besides the Glidden Barb and Putnam machine, and, as the suits will probably not be tried before September, the "moonshiners" referred to concluded to make the Four-Pointed Barbed Wire in the meantime. They seem to rely upon the law's delays and the demand from Texas and other States and Territories not in the circuit presided over by Judge Brewer. Upon the visit of Mr. Washburn several of the "moonshiners" appeared to be, to use a Western expression, very lively corpses—one in particular, the Southern Wire Company, being under full headway, it is stated, when Mr. Washburn visited the factory. On the other hand, it is stated, that papers for nearly 140 suits are prepared, and interference with sale by jobbers will probably result in early recognition of the force of the patent and decision. In such a state of affairs it is impossible to maintain prices, in view of the anxiety of manufacturers to hasten sales.

Hardware.—We note a seasonable demand, and prices are generally maintained. All building material is in good demand with dealers. The supply of Steel Nails, it is stated, is not so full as that of Iron, and higher prices may be expected on both kinds. The change of the South Tredegar Iron Company to the manufacture of Steel Nails is opportune.

Merchant Iron.—Prices not yet changed, and \$1.75 at store is still current. The weak demand is probably the cause of tardiness in advancing prices at this point, coupled with the advantage several stores possess in having connections with mills operating with non-union men. Quotations are, however, limited to early acceptances.

Wire.—The prices for sizes commonly used for barbing have, no doubt, been affected by the change in the Barbed-Wire market, and there seems to be nothing special in 2 3/4¢ for the Annealed and Bright, and 3 1/2¢ for same sizes Galvanized, usual proportion of quantity of No. 13, and customary 2¢ cash discount.

Barbed Wire.—There seems to be so much licensed Barbed Wire on hand or easily obtainable that this market has not recovered from the low prices to which competition with the unlicensed forced it. And there is still considerable unlicensed Wire being made here, especially of the Four-Pointed Barb. No doubt all prices for considerable quantities have been decidedly confidential of late, and cash buyers appreciate their advantage over manufacturers who are anxious and eager to sell.

Spelter.—The demand has improved somewhat, and with decreased output may make the price of 4¢ here something more than nominal.

Lead.—There is an improved demand, with firmer prices.

W. H. SHIELDS, 318 Olive street, St. Louis, reports as follows, under date of June 15, 1885: *Pig iron.*—There is no improvement in this market, and none is looked for in the near future. By July 1st we shall but two furnaces in blast in this district—one coke and one charcoal. For lots of 100 tons and over buyers name the following figures for carload lots:

CHARCOAL FOUNDRY.

Missouri.....	\$14.50 @ \$17.00
Southern.....	17.00 @ 18.50
COAL AND COKE FOUNDRY.	
Missouri.....	14.50 @ 17.00
Southern.....	15.00 @ 17.00
American Scotch.....	17.00 @ 20.00
MILL IRON.	
Missouri.....	14.00 @ 14.50
Southern.....	13.50 @ 14.00

CAR WHEEL AND MALLEABLE.

Southern.....	22.00 @ 25.00
Lake Superior.....	22.00 @ 24.00
SCRAP.	
Old Car Wheels.....	14.50 @ 15.00
Old Rails.....	17.00 @ 17.25

The following St. Louis manufacturers were awarded first-class medals at the New Orleans exposition: Medart Patent Pulley Company, for their patented Pulley, Blackmer & Post, for their Culvert, Sewer, and Drain Pipes, Whitman Agricultural Company, for Hay Press, Laclede Fire Brick Company, for Fire-Brick, Terra-metallic paving Brick and Sewer-Pipe. This last company also secured gold medal for Gas Retorts.

Foreign Markets.

FRANCE.

PARIS, June 2, 1885.—*Metals.*—General trade in France has been buoyed up by the fine weather, which it is believed has come timely enough to do away with the bad effect which the abnormal temperature—receding it—middle of May—has had on crops. Metals have been more active: Copper steady, Tin higher, Lead sustained, but Spelter lower. We quote at the close, in francs per 100 kg.: Copper, Chili Bars, 118.25 @ 118.75; Ingots and Slabs, 123.50; Best Selected, 125; and Pure Corcoran Ore, 117.50; Tin, Banca, 232.50; Billiton and Straits, 231.25; Australian, 232.50, and English, 233.50; Lead, 27.50 @ 28.25, and Spelter, 35.25 @ 35.50. Iron.—There is a strong movement on foot in various Iron districts of France to curtail production; our markets are to some extent strengthened by efforts of the kind, as well as a generally more active consumptive demand. Prices of iron had been depressed so low since the commencement of the year that the slightest prospect of a revival has a tendency to fortify the views of producers and holders. It cannot be said, however, that the position of our own market has so far been benefited by the favorable change that is developing, and we cannot quote Flooring and Merchant at this writing any better than 13 @ 11.25 francs per 100 kg. Old Rails in this city have meanwhile sold slowly at 7.50 @ 8 francs, and Cast-Iron Tubing at 16 francs. The North has been firm at 13.50 francs for Merchant. Coal.—Now that fine weather has set in, Coal has gone on weakening and stocks are accumulating.—*Moniteur des Interests Materiels.*

BELGIUM.

BRUXELLES, June 2, 1885.—*Iron.*—Since our last report the Belgian Iron market has shown no decided tendency either way, in spite of the advance which has taken place in France in some articles in the iron line and a disposition in Germany to raise prices of certain products. The only article forming an exception among us are Beams. Of these and Structural Iron generally large shipments are going on to Roumania. Meanwhile Pig Iron has been flat, without change in prices. If the various districts in Belgium can be made to see their own interest, the efforts of the National Beam Railroad Company will not have been in vain, and it is to be presumed a great impulse will, in that event, be given to Belgian Iron industry. It is also to be hoped and expected that orders for Netherlands India and China will soon begin to drop in once more, now that there is no reason to delay them any longer. While in April everything looked doubtful and threatening, nothing was done for account of distant countries. Since then there has been a favorable change, and we trust activity in that direction may soon be resumed. The general outlook on the Continent is more encouraging than otherwise, especially as regards crop prospects, which are now fair. There has been no change in prices since our last week's quotations. Coal.—The restriction of output resolves upon in the Rhinish provinces of Prussia and Westphalia has had a hardening effect in the Belgian Coal market, both on Coal and Coke.—*Moniteur Industriel.*

GERMANY.

HAMBURG, June 2, 1885.—*Iron.*—Contrary to expectations, not much activity was developed in Rhinish Westphalia during the week consumers still holding back. The quotations at Düsseldorf are as follows: Prime Spiegel, 4¢ @ 50 marks; White Pig No. 1, 45 @ 50; Thomas, 42 @ 43; Siegen-Nassau, 42 @ 43; Luxembourg, 35; German Foundry No. 1, 50 @ 61; No. 2, 50 @ 51; No. 3, 50 @ 51; Spanish Mudeja, 49 @ 50; English No. 3, 50 @ 50; English Bessemer at port of shipment, 43 @ 44; Spanish do. Mudeja at Rotterdam, 50 @ 51; German Bessemer, 46 @ 47; Merchant 107 @ 130; Sheets, 145 @ 146. In Upper Silesia the Iron market has been steady. German Pig Iron production in Germany, Luxembourg included, in April was 326,858 tons, of which 162,966 tons Pudding Pig, 10,273 Spiegel, 42,981 Bessemer, 14,653 Thomas, and 30,965 Foundry Pig. Last year's April production was 335,025. During the first four months the output was 1,342,734 tons, against 1,163,955 in 1884. Wire Bars are very cheap, being offered at 82 @ 83 marks, but Steel Bars are high, 148 @ 147, the tendency therein still being upward. If not brilliant, the general outlook for German Iron and Steel industry is encouraging, since the movement to curtail production has met with such general approbation. Much will, of course, depend on the course of general business, which will again be influenced by our crops. Meanwhile *Metals* trade has been quiet, with continued firmness in Lead, which is scarce, and weakness in Spelter. We quote at the close: German Lead, 12.50 marks @ 50 kg.; Lake Copper, 53 @ 56; Spelter, 13.50 @ 14.10, spot, and 13.60 @ 13.80 to arrive. Tin, —84 @ 97.—*Borrenskalle.*

RUSSIA.

ST. PETERSBURG, June 1, 1885.—*Metals.*—According to the official returns, just published, the import of Coal and Metals has been, in thousands of roubles:

	1884.	1885.
Coal.....	15,410	17,342
Pig Iron.....	11,343	9,628
Sheet Iron.....	5,374	7,718
Wrought Iron.....	4,423	6,394
Copper, in Sheets.....	2,474	2,023
Tin.....	1,399	1,529
Ingot Copper.....	1,151	883
Steel.....	1,138	819
Manufactures of Iron and Steel.....	16,102	18,068
Engines.....	14,185	17,521
Agricultural Machinery.....	5,284	5,617
Castings.....	2,181	2,417
Portable Engines.....	1,852	1,501
Iron Vessels.....	1,620	2,030
Total.....	84,901	83,880

The new duties which became operative since the 18th ult. compare with the old ones as follows:

	Old duty.	New duty.
Per pud.	Per pud.	Per pud.

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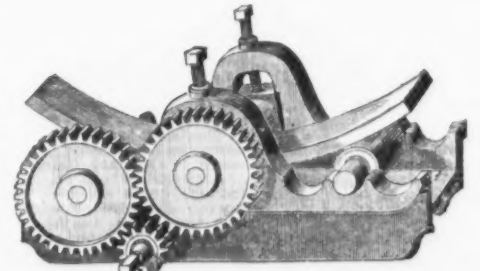
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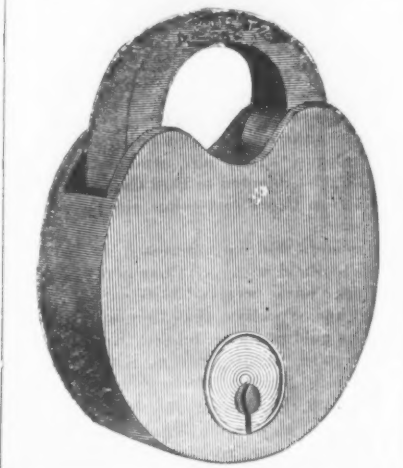
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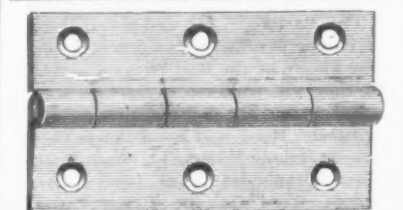


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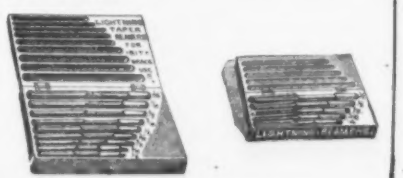
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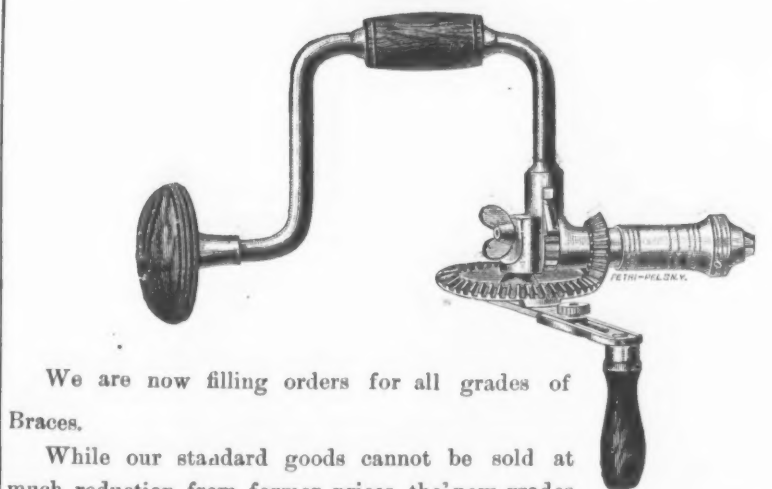


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THE IRON AGE BOOK DEPARTMENT.

IRON, STEEL AND METALLURGY.

Greenwood.—*Steel and Iron.* Comprising the practice and theory of the several methods pursued in their Manufacture, and of their treatment in the Rolling Mill, the Forge and the Foundry. By W. H. Greenwood; 97 illustrations, 536 pages, 12mo, cloth. . . \$2

This work satisfactorily presents in convenient form the most important processes employed in the manufacture of iron and steel. The illustrations are in most cases reduced from actual working drawings. The style is simple and clear. Although many of the recent improvements in American practice have not received the thorough attention which they merit, the book treating more particularly of English practice, the author has succeeded in producing a comprehensive manual for the technical student, and an intelligible and valuable assistant to the practical iron-worker. The chapter headings are as follows:

Explanation of Terms; Refractory Materials, Crucibles, &c.; The Ores of Iron; Metallurgical Chemistry of Iron; Cast or Pig Iron; The Production of Pig Iron; The Blast Furnace; Hot-Blast Stoves, Hoists, Lifts, &c.; Fuel, Blast, Charges, Yield and Waste Gases of the Blast Furnace; Castings in Iron, Foundry Appliances, &c.; Malleable or Wrought Iron; The Production of Malleable Iron Direct from the Ore; Indirect Methods for the Production of Malleable Iron; The Production of Malleable Iron in Open-Hearth Furnaces; Refining of Pig Iron; Puddling; Mechanical Puddling and Rotary Puddling Furnaces; Forge and Mill Machinery, Furnaces, Plant, and Operations; Steel and Ingot Iron; The Methods Employed in the Production of Steel Direct from the Iron Ore and by the Carburization of Malleable or Bar Iron, by the Decarburization of Pig Iron in the Finery or in the Puddling Furnace, by the Fusion of Pig Iron with Malleable Iron or with Iron Ores in the Open-Hearth Steel-Melting Furnace; The Bessemer or Pneumatic Process for the Production of Steel from Pig Iron; The Basic Process for the Conversion of Phosphoric Pig Iron into Steel in the Bessemer Converter; The Production of Homogeneous Steel Ingots. Fluid Compression of Steel, Compound Armor Plates, &c.

Thurston.—*Materials of Engineering.* By Robert H. Thurston, C. E., Professor of Engineering, Stevens Institute of Technology.

Part II, Iron and Steel; 143 illustrations, 680 pages, 8vo, cloth 1883. . . \$5

In this, the second volume of Professor Thurston's important work on the materials of engineering construction, the author has included a large amount of practical information not heretofore available without consulting many different authorities. The ores of iron, their classification, analysis and reduction have received thorough treatment. The construction and management of blast furnaces and the different operations connected therewith are comprehensively detailed. The subject matter comprehends all the practical operations employed in the manufacture of iron and steel, so simply expressed as to be readily understood by those of limited education. There are several chapters upon the strength, elasticity and resistance of the metals treated, under the effects of time, temperature and repeated strain, with the necessary formulae and diagrams. The work is valuable not only as a text-book for the student and engineer, but equally so as a work of reference for the manufacturer and mechanic. Considerable space is given to the most approved methods of manufacturing malleable iron, and the tests of iron and steel are carefully considered and illustrated by recent examples.

Thurston.—*Materials of Engineering; Part III. Non-Ferrous Metals and Alloys.* By Prof. Robert H. Thurston; illustrated, 575 pages, 8vo, cloth. . . \$4

This is the concluding volume of a work in three parts designed for engineers, students and artisans in wood, metal and stone. Part I discusses the non-metallic materials of engineering. Part II is entitled "Iron and Steel." In the present volume the history, general processes and properties of the metals and their alloys are considered in Chapter I. In Chapter II the non-ferrous metals, copper, tin, zinc, lead, antimony, bismuth, nickel, aluminium, platinum, mercury, &c., are specially described, together with their sources, distribution and methods of reduction. The remaining twelve chapters treat in detail upon the properties of alloys,

chemical and mechanical; the bronzes and brasses, their composition and uses; the kalchoids, or copper-tin-zinc alloys, and the other miscellaneous alloys; the manufacture and working of alloys; the strength and elasticity of non-ferrous metals; strength of bronzes and other copper-tin alloys; strength of brasses and other copper-zinc alloys; strength of the kalchoids and other copper-tin-zinc alloys; strength of zinc-tin alloys; conditions affecting strength, such as heat, change of temperature, effects of stress; and the mechanical treatment of metals and alloys; 96 tables of tests of the different materials are included and, a complete classified index accompanies the work.

Bell.—*Principles of the Manufacture of Iron and Steel, with Some Notes on the Economic Condition of Their Production.* By I. Lowthian Bell, F.R.S.; 10 full-page plates, 744 pages, 8vo, cloth. . . \$6

This extended and comprehensive treatise is an outgrowth, as stated by the author in his introductory chapter, of a request, from the British Iron Trade Association, to prepare a report on the present condition of the manufacture of iron and steel as illustrated by the objects displayed at the French International Exhibition of 1878, in Paris. This work contains not only the general results then arrived at, but also more extended investigations and experiments which it was considered necessary to pursue to thoroughly discuss the subjects under treatment. The appended headings of the 18 sections into which the volume is divided will give an idea of its scope:

Section I. Introductory. Section II. Historical. Section III. Direct Processes Preliminary Treatment of Materials for the Making Malleable Iron. Section IV. for Blast Furnace. Section V. The Blast Furnace. Section VI. On the Use and Theory of the Hot Blast. Section VII. On the Quantity and Quality of the Fuel Required in the Blast Furnace Using Air of Different Temperatures. Section VIII. On the Solid Products of the Blast Furnace. Section IX. Chemical Changes as They Take Place in the Blast Furnace. Section X. On the Equivalents of Heat Evolved by the Fuel in the Blast Furnace. Section XI. On Hydrogen and Certain Hydrogen Compounds in the Blast Furnace. Section XII. On the Production of Malleable Iron from Pig Iron in Low Hearths. Section XIII. On the Refining and Puddling Furnace. Section XIV. On More Recent Methods of Separating the Substances Taken Up by Iron During Its Passage Through the Blast Furnaces. Section XV. Statistical. Section XVI. British Labor Compared with That of the Continent of Europe. Section XVII. On Labor in the United States of America. Section XVIII. Chief Iron-Producing Countries Compared.

Bayley.—*The Assay and Analysis of Iron and Steel, Iron Ores and Fuel.* By Thomas Bayley; 17 illustrations, 91 pages, 12mo, cloth. . . \$1.40

This little book is a reprint, with some additions, of a series of articles which have appeared in the *Mechanical World* (England). It is intended for practical men possessing some knowledge of chemistry as well as for students of chemistry in general. The methods of analysis described have been personally tested by the author in his extensive practice. A table of the atomic weights as recalculated by Mr. F. W. Clarke is included.

Weeks.—*Report on the Manufacture of Coke.* By Jos. D. Weeks, Special Agent; 26 (mostly full-page) illustrations, 114 pages, quarto. Paper, \$1.50; cloth, \$2.

As stated by the author, this report embraces the complete statistics of the production of coke during the census year 1880, together with such information regarding the characteristics of the works, material used and labor employed, as could be obtained. The report is divided in five parts. Part I is entirely statistical. The coal fields and coal of the United States in their relation to the manufacture of coke in the census year is discussed in Part II, together with the history of coke manufacture in the several states individually. Part III treats of the history of coking in Europe. In Part IV the subjects of coal and coal washing are considered, and the properties, composition and analyses of European and American cokes are discussed. Part V includes in detail descriptions of the various methods of coking; first, in piles or mounds; second, in rectangular kilns having brick or stone sides, and entirely open at the top; and, third, in closed kilns or ovens of brick and stone, together with the special adaptations of each form of oven to the coals of different localities. Full information is given as to the utilization of waste products. The illustrations

include maps of the coke-producing belt, the Connellsville coke region, the New River of Kanawha coking coal field, and cuts of kilns, ovens and coking machinery.

ENGINEERING AND MECHANICS.

Waddell.—*The Designing of Ordinary Iron Highway Bridges.* By J. A. L. Waddell, C. E. Numerous illustrations and seven folding plates showing bridges actually constructed, with their dimensions; 42 tables, 244 pages, 8vo, cloth. . . \$4

This work treats of the ordinary iron bridges of this country, and does not touch upon any of the numerous styles of truss bridges. Though written principally for engineers and students, it will prove useful to county and town officers. It contains tables and rules of simple application by which the weight of iron required for a first-class bridge may be readily ascertained, with an error of but from 1 to 3 per cent. The required amount of lumber, including or excluding waste, is also given. In the chapters on general specifications and bills of material and estimates of cost are rules and information by which a non-professional with a fair degree of accuracy may test the strength and estimate the cost of an iron bridge of any grade. In another chapter is given a list of all the members in the bridges treated, and this list, together with the complete glossary at the end of the book, will be of great assistance to one unacquainted with bridge-building. In the tables will be found the proper sizes for all cases of hip verticals, joists, hand-railing, guard rails, floor beams, beam hangers, lateral rods and struts, lattice rods, stay plates &c., also the most economic depth of truss and panel length.

Seaton.—*Manual of Marine Engineering.* By A. E. Seaton. Second edition, with numerous tables and 96 illustrations, reduced from working drawings; 437 pages, large 8vo, cloth; London. . . \$7.20

This work comprises the designing and construction of marine machinery, as shown in the most recent practice of successful English engineers. The chapter headings include the following subjects: Horse-power, nominal and indicated, and the efficiency of the engine, resistance of ships, and indicated horse-power necessary for speed; space occupied by, and general description of, modern marine machinery; engines, simple and compound; expansion of steam, mean pressure, &c.; piston speed, stroke of piston, revolutions, size of cylinder, cylinder fittings, &c.; the piston, piston-rod and connecting-rod; shafting, cranks and crank shafts; foundations, bed-plates, columns, guides and framings; the condenser, pumps, valves and valve gear; valve diagrams; propellers; sea-cocks and valves; fuel, &c.; evaporation; boilers, their design, proportions, construction and fittings. The fitting-in of machinery, starting and reversing of engines and the materials used by the marine engineer, are also discussed. The author has treated each subject in detail, and as a work of reference the book is of decided value. The Board of Trade Rules for shafts, spare gear and boilers, and Lloyd's Rules for machinery and boilers, are included in the work.

Sinclair.—*Locomotive Engine Running and Management.* By August Sinclair; 36 illustrations, 390 pages, 12mo, cloth. . . \$2

A practical treatise on the locomotive engine, with particulars showing how different kinds of trains are taken over the road with dispatch and economy. The work consists of chapters on engineers and their duties; inspection of locomotives; running a fast passenger train; running a fast freight train; hard steaming engines; injectors; accidents to the valve motion; accidents to cylinders and steam connections; the valve motion; laying out link motion; description of the Stevens and the Joy valve gears; the indicator; detailed directions about the care, management and repair of the Westinghouse air brake and of the Eames vacuum brake; method of finding the power, adhesion and traction of locomotives; easy method of testing water for locomotive boiler use, &c. Particulars of examination given to firemen for promotion on the leading railroads, and many other subjects interesting to those engaged in designing, handling or repairing the locomotive, are included. The writer's experience as a locomotive engineer and round-house foreman has fitted him to present the subject matter

of the book intelligently and in such a simple manner that the practical locomotive engineer and fireman, for whom the book is intended, can readily grasp the whole treatment of the subject.

Weisbach, Dr. Julius.—*The Mechanics of the Machinery of Transmission.* Second edition, thoroughly revised and greatly enlarged by Prof. Gustav Herrmann. Translated from the German by Prof. J. I. Klein. 448 illustrations, 544 pages, 8vo, cloth. . . \$5

From the translator's preface we learn that this volume is the first part of the second edition of what was formerly known as Vol. III of "Weisbach's Mechanics of Engineering." The work treats of the principles of kinematics, or, as the reviser states in a foot-note, "the study of those arrangements of the machine by which the mutual motions of its parts, considered as changes of position, are determined." Chapter I includes journals, shafting, couplings and bearing; Chapter 2, gearing, and in Chapter 3 the subject of rods and their guides is considered. The illustrations and diagrams are well executed, and engineers may rely upon the accuracy of the formulae employed. The present volume will be followed by Part II, upon "The Mechanics of Machinery for Lifting and Transporting Materials," and Part III, considering "The Mechanics of Machinery for Changing the Form and Size of Materials."

Richards.—*Wood-working Machinery and the Arrangements of Factories.* By J. Richards; 64 illustrations, 150 pages, 12mo, cloth. . . \$1.50

The present work is a revised edition of the "Operator's Hand-Book," and is a treatise on the arrangement, care and operation of wood-working factories and machinery. It gives attention to every feature, from the planning of a planing mill to work in the most economical manner, and the setting of a steam boiler to the setting of knives in a planing machine, and the proper way to set about buying machinery to accomplish stated results. It is thorough and reliable.

ENGINEER'S POCKET BOOK.

Nystrom.—*Pocket-book of Mechanics and Engineering.* By John W. Nystrom, C. E.; 18th edition, revised and greatly enlarged, with original matter, 660 illustrations, 671 pages, 16mo, pocket-book form. . . \$3.50

The present edition of this standard work has been thoroughly revised by the author, whose high reputation as an engineer and as an earnest worker in the advancement of mechanical science is sufficient guarantee of the comprehensiveness and accuracy of the book. It treats of the properties of air, heat and steam, the expansion of water, strength of materials, dynamics, acoustics, optics, assaying and chemistry. Tables of the circumference and the area of circles and the logarithms of numbers are included. Also the United States Standard and the Metric System of Weights and Measures and tables of the money and coins of the different countries of the world are given. A knowledge of algebra is not necessary for the use of the formulae. The new matter is principally elements of mechanics; static and dynamic tables; steam engineering; belting; gearing; wire ropes of iron, steel and copper; electro-dynamics and physical science in general.

Trautwine.—*Civil Engineer's Pocket Book.* By John C. Trautwine, C. E. Twenty-second thousand, revised, corrected and enlarged, by John C. Trautwine, Jr., C. E.; copiously illustrated, 866 pages, 12mo, morocco, pocket-book form, gilt edges. . . \$5

Many important additions and alterations have been made in the present edition of this excellent manual for engineers. It treats of mensuration, trigonometry, surveying, hydraulics, hydrostatics, instruments and their adjustments, strength of materials, masonry, principles of wooden bridges and culverts, trestles, pillars, suspension bridges, railroads, turnouts, turning platforms, water stations, cost of earthwork, foundations, retaining walls, mortar, brick, cements, concrete, &c.

SANITARY ENGINEERING, HEATING.

Bayles.—*House Drainage and Water Service.* By James C. Bayles; 5th edition, 3 folding plates and 30 illustrations, 365 pages, 8vo, cloth. . . \$3

This work discusses the subject of house drainage and water service in cities, villages and rural neighborhoods in a manner instructive alike to architects, mechanics and house owners. The best forms of plumbing practice are described and illustrated, and the principles upon which good work depends explained. The book is of practical value to the building trades and all interested in the mechanics of hygiene. The contents are as follows: Hygiene in its practical relations to health. Sewer gas. Waste and soil pipes. Traps and seals and the ventilation of soil pipes. Water closets. Service pipes and water service in city houses. Tanks and cisterns. The chemistry of plumbing. Elementary hydraulics applicable to plumbing work. Sanitary construction and drainage of country houses. Water supply in country districts. Suggestions concerning the sanitary care of premises. The plumber and his work.

Hood.—*Practical Treatise on Warming Buildings by Hot Water, Steam and Hot Air.* By Charles Hood; enlarged edition, 462 pages, 8vo, illustrated with numerous cuts; cloth. . . \$4.25

This book is divided into two general parts. The first subject considered in Part I is warming buildings by hot water. The subjects of circulation, permanence of temperature and construction of furnaces are carefully considered. Following this is an estimate of the heating surfaces required to warm any description of building. A chapter on heating by steam, another on heating by hot air, and two on the laws of phenomena of heat complete this division of the volume. Part 2 gives attention to the various methods of warming and ventilating buildings, the combustion of fuel, forms of fireplaces in chimneys, a chapter on the changes produced in atmospheric air, heat, combustion and respiration; a chapter on the various methods of producing ventilation, and one on the chemical constitution of coal and the combustion of smoke.

Billings.—*The Principles of Ventilation and Heating, and Their Practical Application.* By John S. Billings, Surgeon, U. S. A. 72 illustrations, 216 pages, 8vo, cloth. . . \$3

The author discusses the question of ventilation and heating from various standpoints, beginning with the expense and following by an explanation of the laws which must be observed in the successful accomplishment of this work. There is next presented a very comprehensive description of the various methods of heating, together with some particulars relating to patent systems. Schools, hospitals and other public buildings which require exceptional methods are discussed, and perhaps receive a little more attention than the ordinary house. Principles are so carefully stated in all cases that their application is obvious.

MISCELLANEOUS.

Directory to the Iron and Steel Works of the United States. Prepared by the American Iron and Steel Association; 7th edition, corrected to September 1st, 1884, 202 pages, 8vo, cloth. . . \$3

This work is just what its title indicates. It embraces the blast furnaces, rolling mills, steel works, forges and bloomeries in every State and Territory. The names of establishments are given first, followed by the names of owners and their post-office addresses.

The book contains a complete summary of the number and capacity of the iron and steel works which are described in the present edition, compared with the summary which accompanied the previous edition, which was corrected to July 25th, 1882.

Lamberson.—*Hardware Price Book.* Pocket edition, revised and improved, 244 pages, 4 x 7 inches, leather. . . \$4

This book is well classified and indexed, and the rulings are so arranged that they can be adapted to any stock of general hardware. The pocket edition published in 1879 had many good features, but its imperfect arrangement was a serious objection to it. In the present edition the most important change is in the alphabetical arrangement, which appears to be very complete. The headlines are printed like the catch-words in a dictionary, on the upper corner of each page, so that reference may be made to any article, even without the use of the index.

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Lignumvitae.....	dis 1081085
Pennell Block Co., Lignumvitae and Hickory.....	dis 30
Mattocks.	
Regular list.....	dis 6081085
Meat Cutters.	
Dixon's (P. S. & W.) Nos. 1, 2, 3, 4.....	per doz, \$1.00 17.00 19.00 30.00—dis 40
Miles' Challenge.....	dis 40
Woodruff's (P. S. & W.) Nos. 100 150.....	dis 40
Hales'.....	dis 115 18.00—dis 45
Draw Cut.....	dis 115 18.00—dis 45
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Enterprise.....	dis 25 30.00 60.00
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Manila, 60th, Jan. 10, 1885.....	dis 14
Manila, 61st, Jan. 10, 1885.....	dis 14
Manila, 62nd, Jan. 10, 1885.....	dis 14
Manila, 63rd, Jan. 10, 1885.....	dis 14
Manila, 64th, Jan. 10, 1885.....	dis 14
Manila, 65th, Jan. 10, 1885.....	dis 14
Manila, 66th, Jan. 10, 1885.....	dis 14
Manila, 67th, Jan. 10, 1885.....	dis 14
Manila, 68th, Jan. 10, 1885.....	dis 14
Manila, 69th, Jan. 10, 1885.....	dis 14
Manila, 70th, Jan. 10, 1885.....	dis 14
Manila, 71st, Jan. 10, 1885.....	dis 14
Manila, 72nd, Jan. 10, 1885.....	dis 14
Manila, 73rd, Jan. 10, 1885.....	dis 14
Manila, 74th, Jan. 10, 1885.....	dis 14
Manila, 75th, Jan. 10, 1885.....	dis 14
Manila, 76th, Jan. 10, 1885.....	dis 14
Manila, 77th, Jan. 10, 1885.....	dis 14
Manila, 78th, Jan. 10, 1885.....	dis 14
Manila, 79th, Jan. 10, 1885.....	dis 14
Manila, 80th, Jan. 10, 1885.....	dis 14
Manila, 81st, Jan. 10, 1885.....	dis 14
Manila, 82nd, Jan. 10, 1885.....	dis 14
Manila, 83rd, Jan. 10, 1885.....	dis 14
Manila, 84th, Jan. 10, 1885.....	dis

WHOLESALE METAL PRICES, June 17, 1885.

METALS.

IRON.—Duty: Bars, 8-10 to 11-10¢ per lb. provided that no bar shall pay a less rate of duty than 35¢. Sheet, 11-10 to 15-10¢ per lb. Band, Hoop and Scroll, 16 to 14-10¢ per lb. Railroad Bars weighing more than 25 lb per yard, 7-10¢ per lb.

Standard American Pig Iron.

Foundry No. 1, X..... ton 17.75 @ 18.50
Foundry No. 2, X..... ton 16.50 @ 17.50
Gray Forge..... ton 15.00 @ 16.50

No. 1 Scotch Pig Iron.

Carnegie..... ton 19.00 @ 19.50
Coltess..... ton 21.00 @ 21.50
Shotts..... ton 21.00 @ 21.50
Hogarth..... ton 21.00 @ 21.50
Langdon..... ton 21.00 @ 21.50
Summerlee..... ton 21.00 @ 21.50
Balmington..... ton 19.00 @ 19.50
Eglington..... ton 19.00 @ 19.50
Glyde..... ton 19.00 @ 19.50

Steel, at Eastern mills..... ton 26.50 @ 27.00
O'Connell, T.S..... ton 16.50 @ 17.50

Scrap.

Wrought, ton, from yard..... 18.00 @ 18.50

Bar Iron from Store.

Common Iron:
3/4 to 1 in. round and square..... ton 1.5 @ 1.75¢
1 to 6 in. x 3/4 to 1 in. square..... ton 1.7 @ 2.1¢

Refined iron:
3/4 to 1 in. round and square..... ton 1.7 @ 2.1¢
1 to 6 in. x 3/4 to 1 in. square..... ton 1.8 @ 2.4¢
Rods—3/4 and 1-1/2 round and sq..... ton 1.7 @ 2.2¢
Bands—1 to 3-1/2 to No. 12..... ton 2 @ 2.5¢
Burden's "H. B. & S." Iron, base price..... ton 2.5¢
Norway Nail Rods..... ton 5 @ 6¢

Sheet Iron from Store.

Common..... ton 2.70 @ 3.1¢
R. G. American, Cleaned..... ton 3 @ 3.4¢
Nos. 10 to 16..... ton 3 @ 3.4¢
17 to 24..... ton 3 @ 3.4¢
25 to 34..... ton 3 @ 3.4¢
35 and 36..... ton 3 @ 3.4¢
27..... ton 3 @ 3.4¢
28..... ton 3 @ 3.4¢

Galvanized, 10 to 24..... ton 5 @ 5.4¢
Galvanized, 25 to 34..... ton 6 @ 5.4¢
Galvanized, 35..... ton 6 @ 5.4¢
Galvanized, 28..... ton 7 @ 5.4¢
American Russia..... ton 7 @ 5.4¢
American Cold Rolled B. B..... ton 5 @ 7¢

Iron Wire.—(See Wire.)

STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb. or less, 45¢ ad. val.; valued above 4¢ and not above 7¢ per lb., 25¢ ad. val.; valued above 7¢ and not above 10¢ per lb., 35¢ ad. val.; valued above 10¢ per lb., 45¢ ad. val. Extra—Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 15¢ per lb. in addition to the above; Steel Circular Saw Plates, 1¢ per lb. in addition to the above.

American Cast Steel.

For American Steel, see Pittsburgh quotations.

English Steel.

Best Cast..... ton 15.1¢
Extra Cast..... ton 16.1¢
Circular Saw Plates..... ton 14.1¢
Round Machinery, Cast..... ton 16.1¢
Swaged, Cast..... ton 16.1¢
Best Double Steel..... ton 16.1¢
Blister, 1st quality..... ton 14.1¢
German Steel, Best..... ton 10.1¢
2d quality..... ton 9.1¢
Sheet Cast Steel, 1st quality..... ton 15.1¢
2d quality..... ton 14.1¢
3d quality..... ton 12.1¢

TIN.—Duty: Plates, Sheets, Taggers and Termes, 1¢ per lb.; Bars, Block and Pigs free.

Barica..... ton 24 @ 25¢
Straits..... ton 24 @ 25¢
English..... ton 24 @ 25¢
Bar..... ton 24 @ 25¢

Charcoal Tin Plates.

1 C 10x14 225 sheets..... box \$5.00 @ 7.00
1 C 12x12 225 sheets..... " 10.00 @ 14.25
1 C 10x14 225 sheets..... " 6.25 @ 8.75
1 X 12x12 225 sheets..... " 6.25 @ 8.75
1 X 14x20 112..... " 6.25 @ 8.75
1 C 12x14 170..... " 6.25 @ 8.75
1 X 12x14 170..... " 6.25 @ 8.75
For each additional X add..... 1.25 @ 2.00

Coke Tin Plates.

Best..... Ordinary
1 C 10x14..... \$4.62 1/2 @ \$4.37 1/2 @ 4.50
1 C 14x20..... 4.75 4.50 @ 7.25
1 C 12x12, cutters, 225 sheets..... 8.00 7.25 @ 10.00
1 C 20x28, 112 sheets..... 10.00

Terne Plates.

Prime Char. 2d quality..... Coke.
1 C 14x20 M. F. \$6.75 @ 6.87 1/2 @ 6.50
1 C 14x20 Old Process..... 13.75
1 C 20x28..... \$4.50 @ 4.62 1/2 @ 4.40
1 X 14x20..... 6.00 @ 6.12 1/2 @ 5.80
1 C 20x28..... 9.00 @ 9.50 8.75 8.50 @ 8.62 1/2
1 X 20x28..... 12.50 @ 14.00
1 C 30x20..... 13.50 @ 15.00

Tin Boiler Plates.

LXX 14x26, 2 sheets for No. 7, 112 sheets..... @ \$12.00
LXX 14x28, 2 " No. 8..... " 13.00
LXX 14x31, 2 " No. 9..... " 15.00

COPPER.—Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢ per lb. Manufactured (including all articles of which Copper is a component of chief value), 35¢ ad. valorem.

Ingot, Lake..... ton 11.1¢ @ 11.4¢
Ingot, Baltimore..... ton 11.1¢ @ 11.4¢
Ingot Anchor..... ton 11.1¢ @ 11.4¢
Braziers' Copper, ordinary sizes, 16 oz. sq. ft. and over..... ton 17.1¢
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz. sq. ft..... ton 18.1¢
Braziers' Copper, 10 oz. and 12 oz. sq. ft..... ton 20.1¢
Lighter than 10 oz. sq. ft..... ton 22.1¢
Circles less than 84 in. in diam..... ton 20.1¢
84 in. diam. and over..... ton 21.1¢
Segment and Pattern Sheets..... ton 20.1¢
Locomotive Fire-Box Sheets..... ton 17.1¢
Sheathing Copper, over 12 oz. sq. ft..... ton 16.1¢
Bolt Copper..... ton 18.1¢
Copper Bottoms..... ton 35.1¢
Nickel-Plated Sheathing..... ton 37.1¢
Plating extra..... ton 35.1¢
Flat Copper Boiler Bottoms or Pit Bottoms, cut to special sizes..... ton 21.1¢

Tinuing.

14x15, by the case..... sheet, 8¢
4x18, less than case..... " 22¢
For tinuing both sides, double the above amount.

O'Neill's Patent Planished Copper.—Net.
14 and 16 oz. and heavier..... By the case, 2d 25¢
12 oz. and lighter..... 3d 25¢
7 in., 14x52, 8 in., 14x50, 9 in., 14x50, 14 and 16 oz. and heavier..... By the case, 2d 31¢
(All sizes not over 20 in. wide.)
24x48 and 30x60..... 3d 31¢
14 and 16 oz. and heavier..... By the case, 2d 34¢
12 oz..... 3d 34¢

Copper Wire.—(See Wire.)

Sheathing Metal.
Yellow Sheathing Metal, 1/2 lb..... 20 @ 21¢
Brass and German Silver.

Broken & Sharp's Gauge the Standard for Metal;
Old English Gauge the Standard for Wire.

Brass Manufacturers' Price List, January 17, 1884..... dia. 30 @ 30¢
LEAD.—Duty: Pig, 5¢ per 100 lb.; Old Lead, 2¢ per 100 lb.; Pipe and Sheet, 3¢ per 100 lb.

American..... 3.80 @ 4.4¢
Bar..... 4.5¢ @ 4.9¢
Pipe..... 4.5¢ @ 4.9¢

Block Tin Pipe..... 40¢
Tin Lined Pipe..... 15¢, dia. 20¢
Sheet..... 10¢, dia. 20¢
Chilled Shot..... Drop, 6¢; Buck, 7¢
ANTIMONY..... ton 10 @ 10.5¢
Hallett's..... ton 10 @ 10.5¢
Cookson..... ton 10 @ 10.5¢
SPELTER.—Duty: Pigs, Bars and Plates, \$1.50 per 100 lbs.

American, cash..... 45¢ @ 5¢
Berkensport..... 100 lbs.
ZINC.—Duty: Pig or Block, \$1.50 per 100 lbs.
Sheet, 2 1/2¢ per lb.
600 lb. casks..... 5 @ 5.2¢
Zinc—Open..... dia. 10 @ 20¢
Zinc Tubing..... dia. 10 @ 20¢

Zinc Tubing.—Dia. 25 x..... 27
Plain..... 37
Fancy..... 37
Scotch and Extra Patterns..... 36

HABBITT METAL.
N. P. U..... ton 6 @ 7¢
X..... ton 15¢
X..... ton 30¢

WIRE.
Market Wire.—Put up in 63 lb. bundles.
Nos. 00 to 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 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625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394

INDUSTRIAL ITEMS.

MAINE.

The Lewiston Electric Light Company, Lewiston, now use sawdust for fuel, costing only 75 cents per cord, delivered. They find this fuel more economical than screenings for making steam. Their boilers are set with the Jarvis patent setting, and use Sheffield grate-bars. They use the Armstrong & Sims engines belted direct to the dynamos.

NEW HAMPSHIRE.

The Exeter Machine Works, Exeter, have recently built one 150-horse-power engine for H. H. Amsden & Son, Penacook, and complete steam-heating apparatus for the Profile House, White Mountains. They have also an order for one small engine for Eaton & Sears, Danvers, Mass., and sundry orders of less importance, under way.

The Forsyth Machine Company, Manchester, have begun the manufacture of electric-light dynamos of a new and improved pattern.

MASSACHUSETTS.

Pattee & Draper, Holke, manufacturers of fire hydrants, have removed to a new brick building erected by themselves, situated at the corner of Commercial and Hampshire streets. The structure is 120 x 35 feet, with an L 15 x 35 feet, and is two stories high.

The Whittier Machine Company, of Boston, are making a 125-horse-power boiler for the Brookline Electric Light Company. It will be set with the Jarvis patent boiler setting, and use the National rocking grate-bar.

The Burleigh Rock Drill Company, Fitchburg, are bringing out a new refrigerating and ice making machine. They have sent several sets to the Southern States, and will have one on exhibition soon in a building near the home office.

The Douglas Axe Company, East Douglas, have finished taking account of stock and resumed work in nearly all the departments.

The Atherton Machine Company, Lowell, have purchased of the Lanphar Machine Company, Phenix, R. I., all of the tools and patterns used by the Lanphar Machine Company in making the spinning and drawing frames for which they have achieved such an enviable reputation. The Atherton Machine Company are now prepared to furnish spinning and drawing frames to any who may desire them.

The committee of the creditors of the Lamson & Goodnow Mfg. Co., Shelburn Falls, reported, at a meeting called for the purpose, that the indorsed paper should be scaled 30 per cent, and the undorsed 50 per cent.; that the property should be bonded for the payment in five years, with 5 per cent. annual interest. A trustee is to be appointed to run the plant. All the creditors present acquiesced. Within six weeks the works will probably be under full headway. Seventy-five thousand dollars preferred stock will be issued for running capital.

The Weymouth Iron Works will shut down soon on account of the small demand for nails.

The Greenfield Tool Company, of Greenfield, are enlarging their building next to the railroad track. It will be, when completed, of brick, 35 x 190 feet, two stories high.

CONNECTICUT.

The Pratt & Whitney Company, Hartford, are making an 1800-pound hammer with a 10,000-pound anvil for Desston, Bentley & Garland, of Philadelphia. The anvil is one of the largest ever made there, and will be one casting.

The Russell & Erwin Company, of New Britain, have bought a controlling interest in the Dayton (Ohio) Screw Company, and reorganized the Board of Directors and the list of officers. Mahlon J. Woodruff, of New York, the treasurer of the Russell & Erwin Mfg. Co., is now president of the Dayton Screw Company, and Henry E. Russell, Jr., of New Britain, the secretary of the Russell & Erwin Mfg. Co., and William G. Smythe, of New York, is agent for the Dayton Screw Company. The Dayton Company have a capital of \$350,000 and have been active competitors of the Russell & Erwin Company. The production of the two companies is said to be larger than that of any other screw-making concern in the country.

The Southington Cutlery Company's britania department will shut down for two or three weeks.

A patent has been granted to L. P. Smith, Hartford, for an automatic screw machine, which is a remarkable invention. A machine already constructed has turned out 2500 screws per day, which is about twice the quantity that can be made on a hand machine. As it is perfectly automatic, a large number can be operated by one man, and it turns out a screw from round or square wire. The patent covers 25 distinctive claims.

NEW YORK.

The Burden Works, Troy, will run without change until about July 1, when the usual summer stoppage for repairs will be made, lasting from a month to six weeks. Last year at this time the works were closed.

The Sheldon Axe Works, of Auburn, are to be removed to Scranton, Pa. They have a capital of \$400,000 and will give employment to 1000 men. This acquisition to the manufacturing industries of the City of Scranton was mainly accomplished through the personal efforts of Col. J. A. Price, the president of the Board of Trade.

The Schenectady Locomotive Works, Schenectady, are building at the rate of 10 locomotives per month.

The Wagner Car Company, of Buffalo, have leased the Jones Car Works, at Schenectady, and will take possession July 15. The Buffalo works will be removed to Schenectady in the fall. The Jones Works

have facilities for employing 350 men and the Wagner Works employ 160 men. These forces will be united, and an establishment expected to rival the Pullman Works is to be built up.

It is proposed that the capital stock of the reorganized Albany and Rensselaer Iron and Steel Company be \$2,500,000. Of this, \$1,750,000 have been subscribed, and \$250,000 more pledged, leaving unpledged only \$500,000, which will probably be taken in Troy. Erastus Corning puts in the present works, valued at \$800,000, the cost of the furnace, estimated at \$600,000, and \$100,000 for a new roof on the steel works and repairs, leaving a working capital of \$1,000,000.

NEW JERSEY.

The Trenton Iron Company, of Trenton, are to take up the manufacture of bar wire. A galvanizing plant is now being placed in. A separate building for the manufacture of picket fences is being erected.

PENNSYLVANIA.

The Tanite Company, Stroudsburg, report a steady demand for their emery-wheels and grinding machinery, which has kept them busy through all the period of dullness. They are about to bring out some new grinding tools which will be of interest to machinists.

There are now no furnaces in blast in the Allegheny Valley District. Rebecca Furnace, at Kittanning, the only one in blast for some time, blew out early this month.

Four new wells are under way in the Murrysburg gas district.

The coke ovens at Spring Grove, Fayette County, are being torn down and the stone shipped across the river to the new ovens now being erected on the Dickerson Run branch of the P., McK. & Y. R. R., by Brown & Cochran. Fifteen of the 100 coke ovens under construction by this firm, will be fired up this week. The remainder will be charged as fast as finished.

J. B. Moorhead & Co. blew in their Merion Furnace, in West Conshohocken, on June 9. The furnace has been standing idle for some weeks, during which time it has undergone general repairs. A good number of men will be given employment.

The puddle furnaces in the plate mill of the Pottstown Iron Company will start up double turn this week.

The Everett Glass Company organized recently by the election of Hon. John Cessna as president; John A. Gump, vice-president, and Dr. H. H. Hill, treasurer.

It is expected that the Gibraltar Iron Works of Seyfert & Co., near Reading, will start up soon, all arrangements having been completed. About 100 hands will be employed, and the orders received will keep the mill in operation for a long time.

The court has ordered the trustees' sale of the Glendower Iron Works to be set aside and has ordered a new sale. The sale will take place on Saturday, September 19, 1885.

The manufacture of apple parers for use next fall has been commenced at the Reading Hardware Works. Their parer is said to be one of the best in the market, and they expect to make nearly 10,000 to meet the demand for the coming season. They have made many hundred thousands of parers.

A syndicate of Mercer County capitalists recently commissioned Hon. Earl A. Wheeler to visit England to confer with Alfred Davy, inventor and proprietor of the Davy process of steel manufacturing, and inquire into the feasibility of erecting large steel works on that plan in that locality. The conference is believed to have resulted satisfactorily, and Mr. Wheeler, accompanied by the inventor, has taken passage for America and is expected in Sharon in 10 days. Those interested say that it is probable there will be steel plants located at Sharon, Sharpsville and Middlesex.

The Newcastle Plow Works were organized by the election of the following officers, at a meeting of the stockholders, held Friday of last week: Directors, Charles S. Clark, Thomas Waddington, Joseph M. Burton, S. S. Smith, W. S. Felton; president, Charles S. Clark; secretary and treasurer, Joseph M. Burton. Messrs. Burton and Waddington, into whose hands the matter had been given, stated that they had closed the purchase of the North Fairfield Works for \$16,000, and that the machinery, patterns, &c., would be in Newcastle about the 25th of June. The plow has been rechristened, and will hereafter be known as the "Keystone Chilled Plow." The company, as stated before, have purchased the Keystone Foundry and Machine Shop, where the plows will be made, and a new building is to be erected for fitting them up ready for shipping.

An explosion of gas occurred a few days ago at Isabella Furnace, Barneston, Chester County. One employee was killed and several others were injured. The cause of the explosion is unknown. This furnace certainly seems unfortunate.

PITTSBURGH AND VICINITY.

The bar-mill crew of the Smith, Sutton & Co. Steel Works are on a strike. The firm had been paying over price for finishing soft steel, and reduced the wages to the common scale price. The workmen refused to stand the reduction and the firm paid them off and the works are idle.

The Standard Nut Works, at South Fifteenth street, will start up double turn this week. Natural gas will be used in all departments.

The style of Evans & Co., glass manufacturers, has been changed to Hogan, Evans & Co., Mr. Edward Hogan being the new partner.

It is expected that Abel, Smith & Co.'s glass plant will be completed about the middle of August. The building will be made as fire-proof as possible. Work will not be commenced until September 1.

OHIO.

Representative iron manufacturers of Youngstown met on June 9 and decided to

engage in the manufacture of steel. A plant will be erected as soon as possible for the purpose of producing steel billets in such shape as can be used by the rolling mills in the Mahoning Valley. As yet the process to be used has not been decided upon, several being under consideration. The new project will have an abundance of capital to make it a success.

The Howard Furnace report that they are out of blast, stock consumed, hands scattered, and that they will be idle during 1885.

The Crown Flint Works, at Ravenna, have shut down on account of the scarcity of coal, resulting from the miners' strike in the Ohio Valley. They will resume operations about July 1.

Iron-ton Furnace is drying out. Stock will commence coming in at an early date, and some time this week the furnace will blow in.

The Etna Iron Works, Pittsburgh, have practically passed into the hands of Mr. A. Pluemer, who has purchased over half the stock at 10 cents on the dollar, giving his notes therefor at 6 and 12 months, without interest. Messrs. Ellison, Dempsey, McGovney and Enoch each retain one share of stock, so as to remain on the Board of Directors and keep the organization intact. The substantial result of the transaction is that the stockholders get rid of their stock at 10 cents on the dollar and escape further liability. What Mr. Pluemer's engagements or plans are we do not know, nor does any one but himself, but in a few days we shall know, for the transaction will probably be completed very soon. Mr. Pluemer is a gentleman of energy and high character, and he has always had strong confidence in the iron-making facilities of Etna. We trust his venture will prove of profit to himself and the community.—Iron-ton Register.

The Belfont Iron Works Company announce that at the annual meeting of their stockholders, on July 15, there will be submitted to the stockholders the question whether the company shall engage in and carry on the business of manufacturing steel, either alone or in connection with others.

ILLINOIS.

A new engine lathe for turning shafting is being built at the Columbian Iron Foundry and Machine Tool Works of Chicago. It is the invention of Nicholas Thomas, the superintendent of the works, and as an especial feature has the bottom formed into a trough to be filled with water, in which the shafting to be turned is submerged. The cutting tools, three or four in number, are set in a circle and made double. They are set starting at opposite ends of the shaft and work toward the center, or, if preferred, they may be set in the center and worked outward to the ends of the shaft.

J. P. Marsh & Co., of Chicago are in receipt of a second order from the Fitzroy Meat Preserving Works, of Rockhampton, Queensland, Australia, for 20 perometer gauges and one screw test pump and test gauge. The company are placing upon the market an entirely new automatic air-valve, for which they have already secured a number of large orders. They are busy in their steam-gauge department.

Letters of incorporation have been granted to the Seavey Brothers Mfg. Co., of Chicago, capital stock \$20,000, to manufacture wrought-iron ranges, &c. Incorporators, Elzior D. Seavey, Henry M. Seavey and William C. Seavey.

We are informed by Mr. W. W. Waugh that the Belleville Nail Company, Belleville, have determined upon the erection of a steel plant, but are as yet undecided as to the process. It will be either the Gordon patent or the Bessemer. A 3 or 4 ton converter will be erected in the near future. None of the contracts have been let. The Belleville Nail Company have an abundance of room for the contemplated works, and believe that they have one of the best locations in the West for the same.—St. Louis Age of Steel.

MISSOURI.

The Pond Engineering Company, of St. Louis, have been awarded the contract for the complete plant of pumping machinery for the Mason City (Iowa) Water Works. It will consist of two Blake duplex pumping engines having a combined capacity of 1,500,000 gallons in 24 hours, with boilers, feed pump, heater, &c. The competition was very great in this work, and the Pond Engineering Company are to be congratulated for being able to secure the contract under such circumstances.

The St. Louis Sash Weight Company have not lost a day this year, and have sold their product about as fast as made. They are moderately busy now.

INDIANA.

The Shumard Sash Balance Company, Richmond, are running full and are a month behind orders. They have lately enlarged capacity and have still in contemplation further additions to their business to meet the increasing demands for their sash balance.

MINNESOTA.

The Minneapolis Flint Glass Works are to be reconstructed, under the management of Mr. M. Krebs, formerly of the Enterprise Glass Company, Ravenna, Ohio, and plenty of capital is on hand to bring the project to a successful issue. The cause of the recent suspension of these works is said now to be not for want of money, but because of the inefficiency of the constructors, who built the works so that everything has to be pulled down and rebuilt. They will be able to start again shortly.

MICHIGAN.

The Jackson Agricultural Company, engaged in the manufacture of harvesting machines, have moved their manufactory from Jackson to Detroit.

The Buehl Iron Works, of Detroit, ceased operations on June 11, throwing 50 men out of employment. When running with full

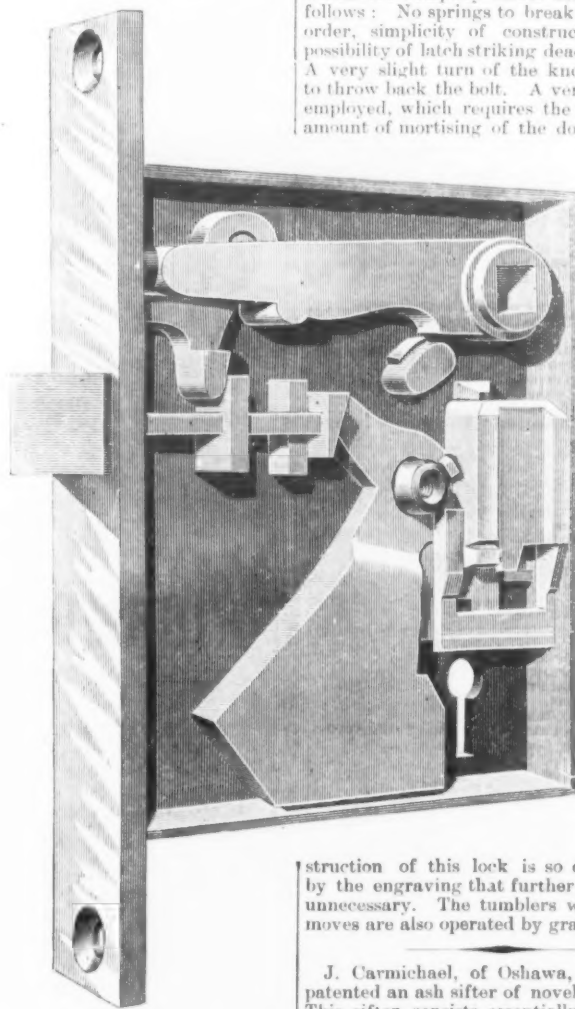
force about 400 were employed, but the force had been reduced on account of the hard times.

We learn from the Fond du Lac Commonwealth that fires were lighted in the blast furnace at that place Thursday, and that the blast will be turned on Monday. The paper states, further, that the improvements made recently give the furnace a producing capacity of about 40 tons of iron per day. The company have made a contract with the Winthrop and the Lake Superior mining

handles are described as made of iron and the blades of the best cast steel. The tool is 6 inches long, with a cutting edge of 3 inches, and is designed especially for amateurs and pattern makers.

New Gravity Lock.

The annexed engraving represents the internal arrangement of a simple Gravity Lock which the Union Door Knob Company of Detroit, Mich., are at present putting upon the market. The special claims to which the company direct attention are as follows: No springs to break or get out of order, simplicity of construction, and impossibility of latch striking dead on the jamb. A very slight turn of the knob is sufficient to throw back the bolt. A very thin case is employed, which requires the least possible amount of mortising of the door. The con-



New Gravity Lock.—Union Door Knob Co., Detroit, Mich.

struction of this lock is so clearly shown by the engraving that further description is unnecessary. The tumblers which the key moves are also operated by gravity.

J. Carmichael, of Oshawa, Ontario, has patented an ash sifter of novel construction. This sifter consists essentially of a square box having a door at one side and a pan at its bottom. Within the box is placed a drum which may be revolved by means of a crank handle. The drum is divided by a horizontal partition into two compartments, of which one is covered with wire netting, while the other is adapted to receive the ash-pan of the stove. An opening in the partition establishes communication between the two compartments. In use the drum is first so placed that the wire netting is on top, and then the ash-pan, with the ashes to be sifted, is introduced. Next the drum is revolved so that the netting is on the bottom. The ashes will now fall through the hole upon the netting, and by rocking the drum to and fro the ashes will be sifted and dropped into the pan below. By again reversing the drum, the coal falls back through the opening into the ash-pan, which is then withdrawn.

A device for cleaning flues of steam boilers has been patented by M. S. Cabell, of Quincy, Ill. The invention has for its object more particularly to properly clean the flue between the point where the blast is injected and the end of the flue through which the cleaner is introduced. The inventor forms back of the nozzle a conical collar or shoulder adapted to partially enter the flue, and made with a series of exterior corrugations or perforations. The nozzle is also provided with spiral discharge passages. The steam as it is delivered from the extremity of the nozzle is blown along in a whirling course, while the air entering the air channels or perforations in the collar rushes along with the steam to clean the flue from end to end. The air inlets are so arranged as to deliver the air at the same angle at which the steam is projected from the nozzle.

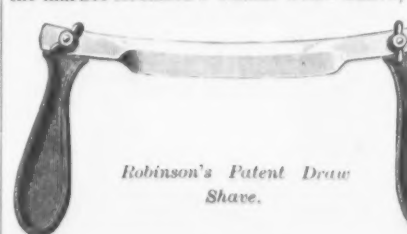
The Lalance & Grosjean Mfg. Co., of New York City, have procured the patent right for a fire shovel stamped from a single piece of sheet metal. Across the lower end of the blade and along both of its sides strengthening ribs are formed. These ribs are made by enlarging the sides of the shovel laterally, so as to form a step or ledge, and then continuing the sides up as usual. It is claimed that by thus forming angular sides the shovel is strengthened, and that its capacity is increased. The ribs run out into the handle and are continued along the middle of the same, so that that portion of the shovel which receives the greatest strain is rendered particularly durable.

A nail set which will not slip off from the nail head and bruise the wood has been patented by G. W. Cannon, of Poughkeepsie, N. Y. The working end of the nail-set is made with a very small point or projection, which may be of conical, pyramidal, triangular or other form. The projection is made by filing or turning away the other parts of the face of the nail-set before the same is hardened or tempered. In operation the projection enters the soft iron nail head and holds the nail-set in place.

The largest torpedo ever used in an oil well was exploded on the 11th inst. in the Horton & Cray well, in the Tiona oil field, Tiona, Pa. It contained 1000 pounds of nitro-glycerine. Though the shot was down in the earth over 1/4 mile, the force of the explosion was felt at the surface.

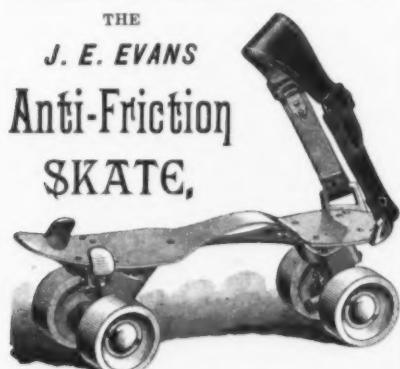
HARDWARE NOVELTIES.

Robinson's Patent Draw Shave. C. E. Jennings & Co., 69 Reade and 87 Chambers streets, New York, are putting on the market Robinson's Patent Draw Shave,



which is illustrated in the accompanying cut, which represents it one-third size. It will be seen from the illustration that by means of a set-screw the handles can be taken off and the tool packed in small compass. The

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Part II, "Stores and Store Details," is now in press. Others to follow.

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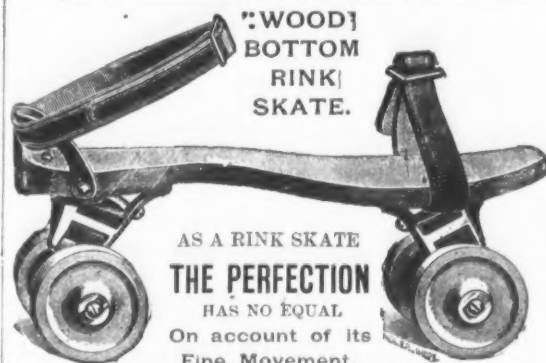
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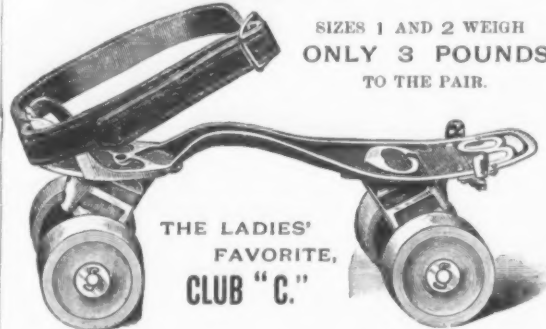
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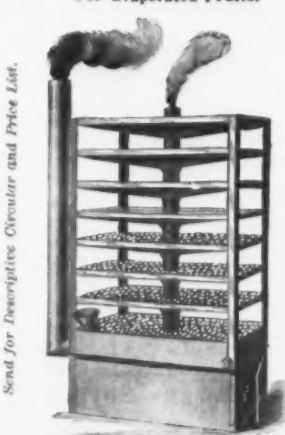


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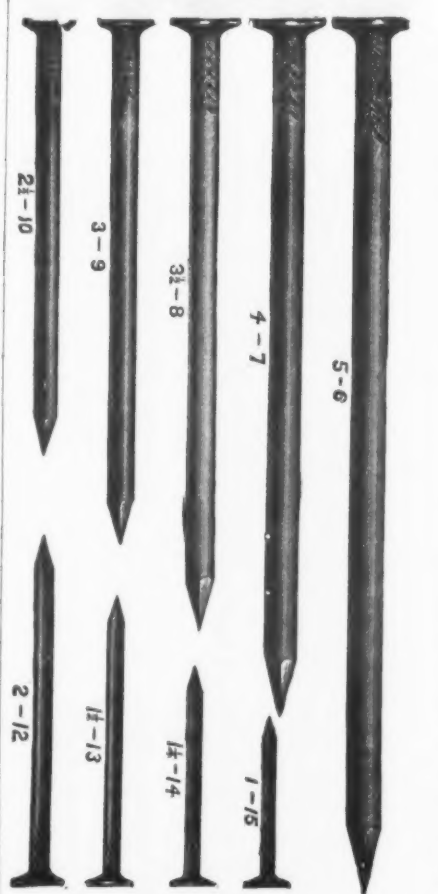
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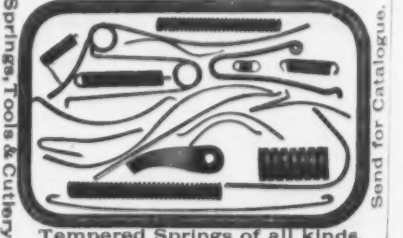


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THE WEEK.

In their argument before the United States Senate Select Committee on Interstate Commerce, the Illinois Railway Commission favored a Federal commission to supervise the various State commissions.

About imported rags the Secretary of the Treasury directs that old rags shall be admitted to entry at the custom house only upon the production of permits from the health officers at the ports of inspection authorizing the landing of the same.

A report from the Mexican capital is to the effect that the national bank of that city has loaned President Diaz about \$4,000,000 in return for the exclusive privilege of issuing circulating notes, and that now the London Bank of Mexico offers to loan the Government \$5,000,000 if permitted to retain its former privilege as to circulation.

The scheme of supplying water to both Newark and Jersey City by means of a dam at Bloomingdale, as proposed by the State Commission, is indorsed by State Geologist Cook.

Tacoma, Wash. Ter., reached from the ocean through Puget Sound, is sometimes pronounced the "Pittsburgh of the West." T. L. Nixon, formerly of Pittsburgh, speaks of the coal fields in that region as extensive, while iron ore is found in abundance, and of lumber the mills of Tacoma alone cut 225,000 feet per week, which is shipped principally to China, Australia and France.

An iron screw-tug, 31 feet long, has been launched by Capt. Tom King at Vicksburg, the first of its kind ever built in that city.

The National Cable Railway Company have notified the trustees of the New York and Brooklyn Bridge that they were infringing upon certain patents owned by the National Cable Company. These patents, the notice averred, were purchased by the National Company of the Cable Railway Company of California, and related to the gripping devices for propelling cars. The National Company, the notice says, would gladly entertain any proposition looking to an equitable adjustment of their claims.

The new building law for New York City has been signed by the Governor, and takes effect immediately.

The Harrison Wire Works plant, in St. Louis, was sold on the 11th inst., under order of the court. George T. Crane and James Cumiskey bought in the property for \$30,000, subject to a mortgage of \$150,000.

The scramble to secure Government contracts which prevailed in Russia during the recent war flury is spoken of by a correspondent of the London Times, who wrote as follows: "To insure the acceptance of their tenders the competitors scatter money right and left, hundreds of thousands, even millions, of roubles finding their way into the pockets of people of influence, of their friends, kinsfolk and mistresses. These gentlemen reckon, and with good warrant, on the venality of the doctors and military commanders, by whose connivance they hope to recoup the money they thus disburse, and millions in addition. On the other hand, the necessity of bribing everybody, the impossibility of making a single step without payment, obliges the contractors to take out the difference in the quality of the stores and provisions which they deliver for the use of the army. In Russia highly-placed personages, as is natural, deign only to accept bribes of considerable amount."

A patented machine was on exhibition at New Orleans for freeing the fiber of hemp and flax from the woody substance which it is desirable to separate from it, and gave greatest satisfaction. The ramie plant taken green from the field, leaves and all, was perfectly divested of everything but the clean and perfect fiber ready for use. The dry stalks of ramie and jute were decorticated with equal success. There appears to be no doubt that this machine will lead to valuable results by cheapening the raw material for the textile industries.

The catamaran Jesse made the remarkable speed of 20 miles an hour in New York harbor last week, which is claimed to be the fastest time ever made by a sailing craft.

Warren Roosevelt, of this city, is building an oil dock for R. T. Bush, at South Brooklyn, which will contain 1,500,000 cubic feet of timber.

The freight tariff on the Pacific slope is considered reasonable for the services performed. From San Francisco to Portland, Oregon—distance, 800 miles—the rate is but \$4 per ton. From same point to Puget Sound or Victoria, B. C., \$5 per ton, and to Alaska \$6 to \$12 per ton. In addition to these rates a charge for primage amounting to 5 per cent. of the rate is added upon all ocean freights, together with customary wharfage charges.

The East River Bridge was brilliantly lighted up by the burning of a tall building near by, in Frankfort street. Are engineers prepared to say what effect upon the bridge cables a large conflagration might have in case the fire is directly beneath?

The little cigar-shaped steamer Stiletto, only 90 feet in length, built by Herreshoff Bros., outstripped the famous steamer Mary Powell last week in a run up the North River. At Yonkers she was a mile ahead,

carrying 120 to 138 pounds of steam. It was said by her builders that she could carry 220 pounds of steam and run at the rate of 27 miles an hour. The run to Sing Sing, 32 miles, was made in 1 hour and 15 minutes. Captain Cornell, of the Powell, denied that there had been a race.

Under a new law signed by the Governor, three commissioners, to be appointed by the mayor, comptroller and president of the Board of Aldermen, are to erect a suitable bridge of stone, steel or iron on the Harlem River at a point 1500 feet north of High Bridge. The bridge is to be completed in three years, and the commissioners are to hold office for that period without salary, but may provide all necessary materials and employ workmen. The bridge is to be 80 feet wide and 145 feet above high-water mark.

H. Comegys, of St. Louis, proposes to maintain a water-works plant costing \$75,000, with 5 miles of drains and 50 hydrants, in Shelbyville, Ill., for an annual payment by the city of \$50,000.

France proposes to maintain her position in Madagascar and is prepared to go further. Meanwhile foreign commerce is extinct.

It is estimated by the president of the Lumber Manufacturers' Association that the log supply of the Northwest for 1885 will be at least 2,000,000,000 feet less than the supply of 1884. "But," says the Chicago Times "even this very large curtailment of the supply is not radical enough, as the cut is still greater than the demand warrants."

The second trial of the case of Pierre Chouteau vs. the Jupiter Iron Works, commenced before Judge Thayer, in St. Louis, on the 8th inst. Chouteau alleges that he contracted to use the furnaces of the works for a specified time, but was precluded from carrying out the contract. He asks for about \$50,000 damages.

The monthly report of the Bureau of Statistics will be resumed.

Prof. I. P. Bishop, lecturing on the salt industry of Western New York, expresses the opinion that that region will yet become the greatest salt-producing district in the world. The works now erected and in operation have a capacity of nearly 2,000,000 barrels per annum, and four other works are now in process of erection.

The works of an electric supply company at Lynn, Mass., are preparing the plant of 90 arc lights, with dynamos and boilers complete, for Lima, to be followed at short intervals by apparatus for several other cities. In all cases iron lamp-posts will be used.

Jay Gould's Mexican Southern Railroad concession was forfeited for a non-performance of contract obligations, and \$50,000 on deposit as a guarantee was covered into the Government Treasury.

The principal Transatlantic steamship lines have advanced steamer rates 25 per cent.

The rope-walk at Bushwick, L. I., 1700 feet in length, is said to be the largest in the United States. About 100 sizes of rope are made, running from $\frac{1}{8}$ inch to 24 inches in diameter. The length of large rope is generally 1000 feet, and the largest rope made nowadays is 15 to 18 inches, and no larger rope or hawser is made except to order. The building is 1700 feet long.

The total immigration for May at all the ports in the United States was 66,971, as compared with 82,581 for the same time in 1884. For 11 months the total is 343,439, against 454,206 last year.

In the case of Abram S. Hewitt and others against the Pennsylvania Steel Company, in which the defendants are charged with infringing the Martin patent of 1868, commonly known as the open-hearth process, the United States Circuit Court in Philadelphia decides that it has no jurisdiction.

A new industry has sprung up in Uruapan, Mexico. The famous coffee of that region is now put up in bottles, in the form of an extract, which is shipped to all parts of Mexico, and an effort is being made to introduce it into the United States.

One of our maritime papers calls attention to the extraordinary performances of the El Dorado steamship, one of four vessels built on the same model by Cramp & Sons and the Harlan & Hollingsworth Company, of Philadelphia and Wilmington, respectively. They are of the following dimensions: 300 feet long between perpendiculars; 350 feet over all; 42 8-12 feet beam; 32 $\frac{1}{2}$ feet deep. The aim in designing was for 9500 to 10,000 bales cotton capacity, an average speed of 12 miles per hour and draft not to exceed 18 feet, cotton loaded. These ships have now been steadily employed eight to nine months, generally making their time 12 to 18 hours quicker, and frequently in 24 hours less, than that for which they were designed, and on both the outward and inward passages have reached within an hour or so of the very best record. Take them all in all, considering the objects sought for, these steamers have had remarkable success. "We much doubt," says our contemporary, "whether our English friends can or have produced equal results in all the needed requisites in the attainment of such successful design."

A certificate to incorporate the American Cable Company was filed in this city on the 12th inst. The object is the manufacture

and sale of materials to be used in the construction of cable railroads. The trustees are Howard Scribner, C. Denmore Wyman, Augustus Hutchings, G. Hilton Scribner, Waldo Hutchings, William Hechert and Waldo Hutchings, Jr.

A great wooden ship measuring 2600 tons, the largest with a single exception ever built in the United States, will soon be ready for launching from the yard of Carleton, Norwood & Co., at Rockport, Me. Her length of keel is 263 feet, and she will cost about \$150,000.

A bill hostile to contract labor in the State penitentiaries has passed the Upper House of the Illinois Legislature.

The State Department has received from the German minister a communication stating that according to the Imperial law of November, 1874, for the protection of trade marks, a registered trade-mark is forfeited if 10 years have elapsed since its registration without any notice having been given of its further extension, or if the same period has elapsed since such notice without a further renewal of the same. As this law took effect May 1, 1875, it will be necessary for American manufacturers to take prompt action if they desire to retain their trade-mark rights in Germany.

Charles Van Bokkelen, a citizen of the United States and an ex-consul of Hayti in New York, was released from the San Domingo prison in which he has been confined for about 18 months for debt, in defiance of international treaty obligations. It is surmised that the expected arrival of the new American minister in a war ship had a salutary effect.

Florida orange growers have arranged to sell 1,000,000 boxes of fruit in New York during the coming season.

A proposition from representatives of the Sanderson Brothers Steel Company, of Sheffield, England, to buy out the Sanderson Steel Works, in Geddes, at 50 cents on the dollar has been accepted. The stock bought consists of \$97,000 owned in Syracuse, \$5000 in Auburn and \$18,000 in New York.

The Postmaster-General has decided not to advertise for bids to enter into contract for the transportation of the foreign mails upon a mileage basis under the permissive authority conferred by the act of Congress of March 3, 1885.

Only four locomotives, it is stated, were shipped from the Paterson shops during May, which is the smallest number since 1877.

Twenty additional inspectors, to be sanitary engineers, will be commissioned to assist in enforcing the health laws of New York City.

It is proposed to form a Central Labor Bureau in Europe for the purpose of taking care that American employers do not import European mechanics to this country, to the detriment of American workmen.

Among the contracts for Indian supplies let on the 13th inst. were 206,500 pounds of barbed and galvanized fence wire to S. H. Crane, Chicago, at 4 $\frac{1}{2}$ cents per pound; A. Henley, 71,000 pounds fence wire at \$4.25 per 100 pounds.

The amount expended thus far on the State Capitol building at Albany approximates \$18,000,000, and \$25,000,000 is spoken of as the possible ultimate cost. The grand staircase and tower are receiving the most attention from the stone cutters. About 650 workmen are employed.

The entire Chinese collection at the New Orleans exposition has been presented to the University of Michigan, and will be placed in the University Art Museum.

President White, of Cornell University, in his annual report to the Board of Trustees urges the necessity of appointing a full professor of mechanical engineering, in addition to the two professors and two assistant professors now directly connected with Sibley College, and proposes that the new professor of mechanical engineering shall be styled "Director of Sibley College," be given great powers, and be held to commensurate responsibilities. It is stated that the special committee of the University, which has been in session during the past winter in New York City and Ithaca, will report unanimously for this position an Eastern man who is identified with one of the leading technical schools.

By the approval of Governor Hill the act of the Legislature passed last year ordering wires underground will be enforced by an underground wire commission.

Mr. Gladstone's resignation has been accepted, and Lord Salisbury has consented to form a Ministry, with Sir Stafford Northcote as Chancellor of the Exchequer.

About 800 tons of flat rails for the Electrical Railway Company are being hoisted to the track in Second avenue, in this city, and by July 4th cars will be running on the cable railroad in Tenth avenue.

The distinctive feature of the United States and national bank note paper now adopted by the Secretary of the Treasury is a single blue silk thread running through the body of the paper.

The headquarters of the hydrographic party now engaged in a survey of the harbor of New York are on board the schooner

Eagle, formerly known as Commodore Gerner's yacht Mohawk, anchored off Governor's Island. Operations are conducted by Lieutenant Hawley, U. S. N. Soundings are to be made not only in the stream, but also in all the docks or slips, and their depth will be determined and indicated on the charts, even up to the bulkheads. This will be a notable gain for the masters of merchantmen, who, when coming to this port and knowing at what wharf they are to unload, may thus learn at once by their charts whether they need to wait for the tide before entering the slip. Characteristics of the bottom will also be observed. Another important feature of this survey will be the study of the currents in every part of the bay and rivers, their direction and strength, and the variation of these at flood and ebb tide and at different phases of the moon.

The contract for the construction of the new ordnance dock in the navy yard at Brooklyn was awarded to Thomas O'Connell. The dock will cost \$50,000, and the job is to be completed in six months.

The committee having in charge the proposed reopening of the New Orleans exposition next winter are said to have adopted a charter and elected managers, and contemplate the purchase of the old building and plant for \$150,000. George M. Pullman is spoken of as president and Samuel Buck director-general of the new organization.

Our attention has been called to an error in our statement made last week that the cost of the ironwork of the Brooklyn Bridge erected was 3.22 cents. It was 3.325 cents per pound.

James Henry Rutter, president of the New York Central and Hudson River Railroad Company, died in Irvington on the 12 inst., of diabetes. He was born February 3, 1836, and the first steam whistle heard in this country, attached to an engine on the Boston and Lowell Railroad, was blown in honor of the event.

Inspector D'Oench was appointed superintendent of the Bureau of Buildings on the 12th inst. under the new building law. The Building Bureau has control of elevators and can close theatres which are not furnished with a brick proscenium arch. Buildings over 70 feet high must be fire-proof, and tenements over 65 feet high must have the stairs fire-proof and inclosed in brick well-holes.

Speaking of depression in the glass trade, a large importer remarks that the cause is overproduction. The manufacturers began business this year with the expectation of turning out 3,600,000 boxes of glass in 10 months. A box contains 50 square feet, and 180,000,000 feet of glass are more than the market can stand. The mills that then began work represented a total of 942 pots. Of this number, factories representing 240 pots had already ceased work on the 1st of May, 92 pots having been closed in the month of April alone. Last year the importing trade diminished 50 per cent.

Governor Hill has approved the Lansing bill, by the terms of which corporations are to be taxed by this State only upon that portion of their capital stock which is employed within the boundaries of the State. This bill is the outcome of a successful action brought by the State Comptroller, and sustained by the Court of Appeals, levying a tax on the entire capital stock of the Western Union, the Gold and Stock and other telegraph companies, the greater portion of whose lines were outside of New York State.

Respecting custom-house appraisals, Secretary Manning writes in a letter to an officer in Philadelphia as follows: "There appears to be no good reason for the failure of the appraising officers, either in Philadelphia or New York, to advance invoices of consigned goods which are unquestionably undervalued to equal at least the cost of production. The fact that a reduction of such advance might be made on appraisement, or that at some other port the same class of goods may be passed at a lower value, is not a valid reason to justify your failure to perform a plain official duty. It is not for you to assume that the importer will appeal from your action, or that, if he appeals, your action may be reversed on reappraisal. The law (Section 2902, Revised Statutes) makes it your duty to ascertain, estimate and appraise the true and actual market value and wholesale price of the merchandise at the time of exportation and in the principal markets of the country whence the same has been imported into the United States, and when it shall appear that such true and actual market value cannot be ascertained to your satisfaction you are to ascertain the cost of production, pursuant to the ninth section of the act of 1883 referred to, and in no case to appraise the goods at less than the cost so ascertained. These statutes are plain, and the appraising officers must comply with and enforce them."

Hon. Joseph Chamberlain, before the Cobden Club, in London, on the 13th inst., said that, despite the exceptional depression in business, he ventured to state that England's general trade was more prosperous than that of any country in the world. Comparing the trade of England with that of America, Mr. Chamberlain read extracts from the report of Mr. McCulloch, recently

American Secretary of the Treasury, on American overproduction, and referred to the marked increase of failures in America as compared with the decrease in England, and quoted from a commercial agency's report on the reduction of wages to show the disadvantages of the protective system. The shipping trade, he said, was "almost entirely in the hands of English ship owners. The American iron trade is most heavily protected, yet there are in that country 80,000 unemployed ironworkers. The English boot and shoe trade is also increasing, and has driven American and French goods from every neutral market, the American traders being burdened by heavy duties on leather. Even in clocks and watches, which are considered indigenous to America, our exports to the United States nearly equal the imports to England, while in the British colonies and elsewhere English goods are pushing American goods out of the markets."

The British ironclad Resistance, now lying at Devonport, will be plated with 16 inches of armor and then towed upon the mud, where a big Whitehead torpedo will be exploded against her, in order to test its destructive power.

The P. and O. Steam Navigation Company, one of the most important in England, will declare a dividend at the rate of 5 per cent. per annum, but they accompany the recommendation with the remark, as to the shipping business at large, that no tangible improvement can be recorded. The oversupply of tonnage may be reckoned by hundreds of thousands of tons.

A "canal union" is in course of formation in this city, with the object of enlarging the Erie Canal at a cost of \$3,000,000.

The New Orleans cotton merchants are said to be alarmed by the decline in local trade, caused by direct shipments of cotton from the interior to avoid port charges.

The twin-screw armor-belted English man-of-war Benbow was launched on the 15th inst. from the yard of the Thames Iron Works and Shipbuilding Company. The Benbow is by far the most powerful ironclad afloat, over 10,000 tons of metal having been used in her construction. She is built entirely of steel. Even her armor plates, which are 18 inches thick, have a facing of 6 inches of chilled steel, and many of them are of the weight of 10 tons. She is 330 feet long, 68 feet 6 inches beam, 37 feet deep, and has a displacement of 10,000 tons. Her engines are 9500 horse-power, and will, it is estimated, give her a speed of 17 $\frac{1}{2}$ knots per hour.

James Maire, a Frenchman who had for several years been employed as a boss machinist in the repair shops of the Sixth-avenue elevated railroad, was crushed to death on Monday by being caught between the platform and a moving locomotive.

Charleston, S. C., is said to be growing more rapidly than ever before.

NEW PUBLICATIONS.

THE COST OF RAILROAD FREIGHT TRAFFIC. By O. Chanute, Consulting Engineer N. Y. L. E. & W. Railroad. Published by the Railway Review, Chicago.

Mr. O. Chanute, first vice-president of the American Society of Civil Engineers, is always a vigorous writer on subjects of railroad economy. The little pamphlet, which is a reprint from a series of articles contributed to the Railway Review, of Chicago, contains an admirable summary of the cost of handling freight on railroads. He follows the classification adopted by him in former investigations on the subject, and gives elaborate details in tabular form of the cost on some trunk lines. It is from this series that we recently reproduced some valuable data on the cost of loading and unloading certain classes of freight without, through an error, fully crediting either Mr. Chanute or the Railway Review. The pamphlet is certainly a valuable contribution to the literature of a subject which possesses very wide interest, and deserves not only the careful study of railroad men, but also of shippers.

TWENTY YEARS WITH THE INDICATOR. By THOMAS PRAY, Jr. Size, 6 $\frac{1}{2}$ by 10 inches, 168 pages. Published by the author. Price, \$2.

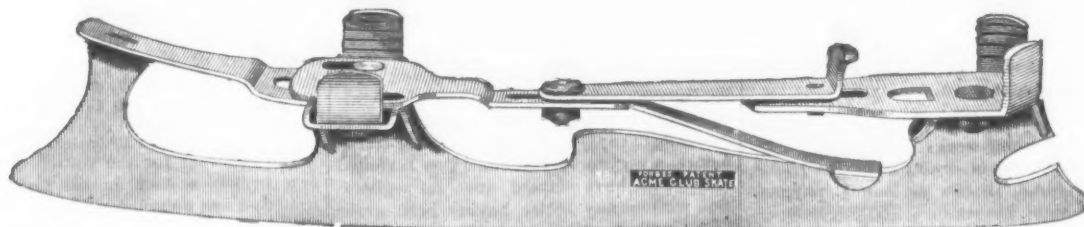
Volume II of the above work, issued a short time ago, supplies descriptions of the Thompson indicator, the pantograph, the polar planimeter, methods of attachment and use, and a large mass of particulars concerning practical work in this field of steam engineering. The larger portion of the book is given up to illustrated lessons taken from actual practice, and showing the various defects and peculiarities encountered in different engines.

A mold of improved construction for casting ingots of deck beams, I-beams, channel bars, railroad rails and like articles having a head or flange on each side of a central web has recently been brought out. In the manufacture of these articles the trouble is that on account of the greater reduction and stretching of the web, in comparison with the heads, the entire beam is thrown on a strain. To overcome this objection Mr. A. Reese, of Pittsburgh, Pa., divides the mold longitudinally into two or more parts, each provided with connecting lugs. Bolts pass through the lugs and cam bars journaled in the bolts, press against the mold and firmly clamp the parts together during the casting of the ingots. As soon as the molten steel is sufficiently set the mold is opened by these cams a sufficient distance to permit the even contraction of the ingot without its being subjected to strain. The enlarged portions of the ingot will slide over the inner faces of the enlarged cavities of the mold, and are thus free to contract, so that all liability of rupture of the central web is said to be overcome.

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LATEST LEGAL DECISIONS.

TRADE-MARK.

S. bought from Asher Bijar, of New York, the exclusive right to his trade mark, "La Normandi," or "Normandi," as a brand of cigars, and on finding that P. was using as his trade mark the words "E. P. Normanda," or "Normanda," he required him to cease this use, and to account for profits made. P. refused to accede to these demands, and S. filed his bill in equity for relief. S. in using the trade-mark substituted on it his name (M. Stachelberg) and his initials (M. S.) for the name and initials of Bijar, and in this form the trade-mark was registered in 1876 under the act of Congress. In this case—*Stachelberg vs. Ponce*—brought in the United States Circuit Court, District of Maine, Judge Colt, in dismissing the bill, said: "The act of Congress under which registration was made has since 1876 been declared unconstitutional, and the complainant must stand on his common-law rights. In the use of the trade-mark the complainant does not state that it was obtained by assignment or purchase from A. Bijar, the originator, and upon whose manufacture the public relied for the quality of the cigars. A trade-mark must, either by itself or by association, point distinctively to the origin or ownership of the article to which it is applied. It imports that the article is made by the original proprietor, and therefore genuine, and the law protects the original proprietor, not only as a matter of justice, but to prevent imposition on the public. Now, in order that the public may not be deceived, it is essential that an assignee or purchaser of the original proprietor should indicate in the use of the trade-mark that he is the assignee or purchaser, otherwise the public is misled into purchasing the goods of another manufacturer or vendor as those of the original proprietor. The trade-mark of S. itself misleads, and he has no right to come here for relief."

DIRECTOR AS AGENT OF BANK.

B. was a director in the Merchants' National Bank, Boston, and he procured therefrom a discount of the note of his firm for \$43,000, with the bills of lading for 155 hogsheads of sugar, the property of I. & Co., as security. The bills imported that the sugars were shipped by order of B.'s firm—in fact, they were consigned them for sale only. The president of the bank agreed to make the loan, and at the next meeting of the board of directors, B. being present, it was approved. It did not appear that B. took any part in the consideration of the loan. The owners of the sugars sued the bank for the conversion of their property, relying upon the point that the knowledge of the fraud of B. was chargeable upon the bank, through him, by his directorship. In this case—*Innerarity vs. Merchants' National Bank*—the trial judge refused to charge the jury in favor of this point, and the bank had judgment. The plaintiff filed exceptions, which the Supreme Judicial Court of Massachusetts overruled. Judge Devens, in the opinion, said: "While the knowledge of an agent is ordinarily to be imputed to the principal, it would now appear to be well-established that there is an exception to the contraction or imputation of notice from the agent to the principal, in case of such conduct by the agent as raises a conclusive presumption that he would not communicate the fact in controversy, when the communication of such a fact would necessarily prevent the consummation of a fraudulent scheme the agent was engaged in consummating. Whether B. acted or not at the meeting of the directors in the matter of the loan, he could not lawfully have done so as the representative of the bank. His individual interest was distinctly antagonistic, and the question before the board related to its approval of a provisional transaction between himself and the president, in which he himself was the proposed borrower and the bank was to be the lender. A director offering a note of which he is the owner for discount, or proposing for a loan on collateral security alleged to be his own property, stands as a stranger to it. In the words of a distinguished English judge: 'That a joint-stock bank should have imputed to it the knowledge which the director has of own private affairs is a most unreasonable proposition.'"

SAVINGS BANK—FRAUDULENT CREDIT GIVEN TO PREDECESSORS.

C. & Co. were private bankers, and as such gave B. a certificate of deposit. They made their business over to a savings bank which was duly incorporated, and the banking house was the former place of business of C. & Co. All of the members of C. & Co. were trustees of the bank, and one was president and the other secretary and treasurer, and these officers had full control of the transactions of the institution. These officers had given to C. & Co. an unauthorized credit on the books of the bank, and they took up the outstanding certificates of deposit of C. & Co., charged them to their account, canceling them with the bank's stamp, and issued for the amount of each the bank's certificates. B. surrendered his certificate and received that of the bank, and this latter certificate was from time to time renewed by the cashier. The fraudulent credit was discovered, and B.'s certificate was repudiated, and he sued the bank and recovered. The bank assigned error to the Supreme Court of Ohio, where the judgment in the case—*Citizens' Savings Bank vs. Blakesley*—was affirmed. Judge Owen, in the opinion, said: "The vital question upon which must rest the determination of the controversy is not one of the fraud or bad faith of the officers of the bank, but of their authority to act for and bind it. If C. & Co. had, in fact, had a cash credit at the bank, against which to charge the amounts of their certificates redeemed, would not this transaction have been utterly unassailable and the bank liable upon this certificate? It seems very clear to us that it would, and as we may treat the credit entries as genuine, in the absence of fraud or bad faith on the part of the plaintiff below, and as the subject of the transaction was within the course of the employment of the officers and of the business of the bank, we may safely rest our conclusion on this view. If the contract is within the authority of the officers, and would be valid and bind the bank under

any circumstances, an innocent party has the right to premise their existence and the bank is estopped to deny them. If the transaction properly pertains to the business of such association as this one, the fraud or bad faith of the managing officer constitutes no defense as against an innocent party. The fact that the cashier of the bank had been a member of the firm of C. & Co. ought not to limit or qualify his authority as cashier while dealing with an innocent party."

The New Navy Ordnance.

The Ordnance Department of the Navy is making all possible effort to complete the batteries for the new cruisers by the time the vessels are ready to be put into commission. The clerical error in the last appropriation bill which deprived the department of an appropriation for this purpose will necessarily occasion some delay, but the majority of the guns can be completed in season. According to the *Army and Navy Journal*, they consist of four 8-inch breech-loaders, in half turrets; eight 6-inch and two 5-inch breech-loaders, for the Chicago; one 6-inch breech-loader for the Dolphin, and four 8-inch and six 6-inch each for the Boston and Atlanta. Of the 21 6-inch hooped breech-loading guns, five have been completed, six are being made under contract with the South Boston Iron Works, five with the West Point Iron Works, and five are being constructed by the workmen at the Washington Navy Yard. The steel forgings for all these guns are made by the Midvale Steel Company, of Philadelphia. Of the guns completed one has been tried, and is said to have stood a higher test than any similar gun ever manufactured. The designs for these guns, as well as all the others referred to in this article, were prepared by the Ordnance Bureau at the Navy Department. The weight of the 6-inch gun is 11,000 pounds. It is designed to carry a charge of 50 pounds and pro-

machine shops of all the other departments have been brought into use for ordnance work, and when all the men are actively engaged the scene in them is quite animated. The most interesting part of the work is in shrinking the jackets and hoops on the tube. When this work is in progress Commander Goodrich and his efficient assistants always have a crowd of interested spectators. This work of assembling the parts is accomplished by heating the jacket to a temperature sufficient to expand it to a size slightly greater than the tube. The utmost skill is necessary in calculating the shrinkage, so as to make the jacket of just sufficient size to pass over the tube when heated and to fit firmly when it cools. Too great a shrinkage would cause a strain on the metal, while, too little would prevent the jacket from fitting closely.

The removal of a jacket from its tube, which was recently made necessary with one of the 8-inch guns, is an interesting piece of work, requiring very skillful manipulation. The gun is so fixed that the molten metal can be poured around the jacket, the heat giving it an expansion sufficient to draw the tube out. Great care is taken to raise the tube from the jacket immediately after being loosened. A short delay would cause the tube to expand proportionately, making it impossible to

tools, &c., necessary to carry on the work of building the guns. Carriages for the guns are also being made. A great lathe is now being constructed for handling the two 10-inch guns. The jackets have been shrunk on these two guns, and when the lathe has been finished they will be pushed to completion as rapidly as possible.

The Wear of Rails.

A correspondent of the *Railroad Gazette* brings out in a letter to that journal the following points affecting the wear on rails. Containing as it does many original arguments, and since it appears to be the result of close observation, it deserves the careful scrutiny of those who are inclined to decide in the laboratory what affects the quality of rails. The writer in question believes the wear to be very probably in accordance with the five following laws:

1. That wherever a rail receives more support vertically at one point than at

known that wherever a Wharton switch safety casting is used by the side of a rail the rail soon becomes bent outwardly at both ends of the castings, and no amount of lining and spiking will hold it in line. It is further noticeable that where planks are laid by the side of rails to make a road crossing, the rails are bent outwardly at both ends of the crossing. Also that the rail has more short kinks between guard-rail chairs than it has on curves where no guard-rail chairs are used.* As illustrating the third law, we find that when joints are allowed to remain low a depression forms in the opposite rail over the tie in advance of the joint. We have reason to believe that where a new rail is placed on the outside of a curve depressions begin forming at once similar in character and nearly opposite to those already existing on the old rail on the inside of the curve. It is well to mention the low spot forming opposite to the point of frog. This law shows the necessity of true levels and the importance of having the track force so arranged as never to allow a joint to become low. As illustrating the fourth law, it is known that a joint allowed to remain low becomes deflected outwardly, and trial with a track gauge will show that the opposite rail has moved toward the joint. In other words, the track has moved laterally.

We know that the outer rail of double track wears faster than the inner. This is due to the support on the inner side of track being more regular. Rails wear faster in cuts than on banks, because little or no attention is paid to drainage, and it is impossible to give equal supports to rails unless drainage is perfect. As regards depression forming in the head of rail, they simply follow the well-known law that "a moving body changing its direction loses momentum." So if the rail deflects appreciably, laterally or vertically, the wheel changes direction in mounting the edge of tie and causes somewhat of a blow. The manner in which the spikes hold the rail to the tie, the width of the tie, the kind of ballast and the uniformity of material in the rail, will all be concerned in the length, depth and location of this depression. Sometimes it occurs over one edge of the tie, sometimes over the other, sometimes it extends all over three places.

The tendency on American railways is toward heavier rails. It is quite probable that this will not prove the most economical way of increasing the life of rails. English roads use heavier rails than we do, and are said to obtain good service; but they also pay more attention to drainage and to the size of ballast. In other words, the character of the support is more nearly uniform than with us. Moreover, it is said that there is a tendency on the part of English roads to use lighter rails than formerly was the case. In the manufacture of large rails it is more difficult to obtain uniformity of material than it is with small ones. We can see in any rail mill that long after the base and web of rail have become black the head is still red. In other words, by the present method of manufacture the tension material (base) is hardest, while the compression is softest, taking longest to cool. The reverse should be true, and it is a debatable question whether it will not pay to arrange some form of oil or water bath through which to pass the head of rail as it comes from the rolls, and thus temper it to any desirable hardness. The great trouble with the American rail, and perhaps with that of English make of recent date, is that it wears so as to show a wavy appearance on top in the sunlight. It has been proposed to remedy this by using a heavier section. This will undoubtedly serve slightly to prevent this wear, in that it will lessen the deflection between ties, thereby preventing a changing of direction in the wheel.

However, suppose we are using pine cross-ties and found that the base of rail was cutting into the ties very badly. Should we in this case increase the size of ties or use a tougher timber? It seems to be a somewhat parallel case, when we find the rail wears in waves, principally because of lack of uniform material in the head, to strengthen them by increased section. I am inclined to think that with the same or softer material in the head of the rail the larger the head the softer the steel, other things being the same, the greater the depth of rail will be, and that it will be true economy to use a comparatively small rail of carefully made and tempered material. We know of a case in which a 56-pound English rail outlasted two 67-pound rails of American make, and is good to outlive another 67-pound American make.

A New Oscillating Engine.

In view of the increased interest with which oscillating engines have of late been regarded in this country, our cuts illustrating a new form of this type brought out by Messrs. Moore Bros., of Boston, Mass., are worthy of attention. Simplicity, compactness, low cost and general efficiency are among the chief characteristics of the engine, which seems to be well designed to prove a serious rival of other low-cost engines now in the market and intended for comparatively light work.

Figs. 2 and 3 are perspective views showing its general arrangement, while Figs. 1 and 4 clearly illustrate the internal working mechanism, making detailed explanation unnecessary. It was the aim of the designer, Mr. E. L. Moore, to combine all the advantages of a good slide-valve engine with the acknowledged advantages of an oscillating cylinder, and at the same time turn out an engine capable of being run in either direction without the use of eccentrics, links or their connections. The principal feature of the design will thus be found in the distributing arrangement, the valve being of the ordinary U-form, and worked by the oscillations of the cylinder. In order to more clearly illustrate the method adopted we will suppose any point of the valve-rod to be connected by a small connecting-rod to a pin fixed on the center line of the trunnions, as at T in Fig. 4. This being the case the valve would remain in the

* After the rail-head has worn down sufficiently for the wheel flange to strike the splice-bar, a hole wears in the side of the rail-head at the end of the splice-plate.

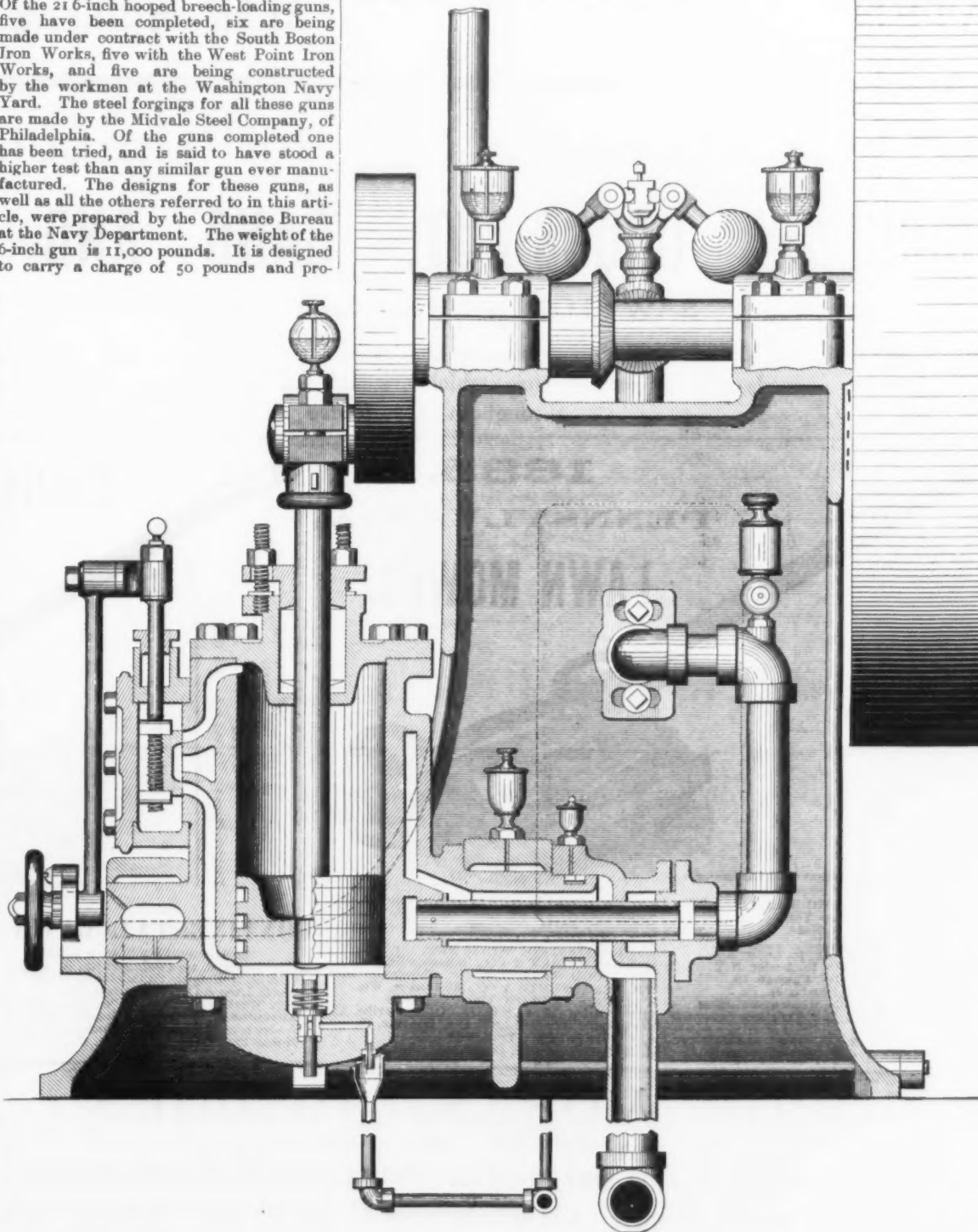


Fig. 1.—Longitudinal Section.

A NEW OSCILLATING ENGINE, BUILT BY MESSRS. MOORE BROS., BOSTON, MASS.

jectile of 100 pounds; initial velocity, 2000 f. s. Of the 12 8-inch guns required, eight have been ordered and are under construction, four are being built at the Washington Navy Yard, and two each by the South Boston and West Point Iron Works.

The 8-inch weighs 27,000 pounds; weight of projectile, 250 pounds; weight of charge, 125 pounds; initial velocity, 2000 f. s. In addition to those above mentioned, the two 10-inch guns for the Chicago and the two 10-inch guns for the Miantonomah are being made at the Washington Navy Yard. The weight of the 5-inch 30 cal. is 5800 pounds; charge, 30 pounds, and projectile, 60 pounds; initial velocity, 2000 f. s. One of these guns will be of 26 cal., and will weigh 4200 pounds. The 10-inch gun weighs 53,000 pounds; charge, 250 pounds; projectile, 500 pounds; initial velocity, 2000 f. s. The tube for the 10½-inch gun will shortly be ordered. The tube for the 12-inch gun will not be contracted for until another appropriation has been made. The 10½-inch gun is designed to weigh 62,000 pounds, and will carry a projectile of 550 pounds, with a powder charge of 275 pounds. The 12-inch gun will weigh 44 tons; charge, 425 pounds; projectile, 850 pounds; initial velocity, 2000 f. s. A 6-inch wire-wound gun is being constructed as an experiment. Its weight is 10,500 pounds; weight of projectile, 100 pounds; charge, 50 pounds; initial velocity, 2000 f. s.

The Washington Navy Yard is now one of the busiest places in the country, and to ordnance people one of the greatest interest. The shops in this yard employ 270 men, which is probably more than one-half of the whole number employed in the yard. The

draw the jacket from it. The steel tubes, jackets and hoops for the smaller calibers were all furnished by the Midvale Steel Company. The tubes and jackets are rough turned and bored at the yard, and then returned to the Midvale Steel Company for oil tempering for the purpose of raising the metal up to the standard. After the tubes and jackets have been tempered, and specimens from them tested and approved, they are again sent to the navy yard, where they are fine-bored and fine-turned, preparatory to assembling with the other parts of the gun, many of which are tempered at the yard. This process consists of immersing the steel at a cherry heat in a bath of oil, and there allowing it to cool. For this purpose there is at the navy yard a tank sunk in the ground about 17 feet deep, with a diameter of 5 feet, and holding 1000 gallons of oil. It is necessary to have the liquid in which the steel is immersed at a low temperature, and to this end the tank is constructed with a 5-inch space around the inner tank, through which water circulates. Sperm oil was at first used, but cotton-seed oil is now substituted, as it is much cheaper and answers the purpose equally well. On cooling, the steel is tested to ascertain the tensile strength, elasticity and extension, and it is often necessary to repeat the process or to anneal it. The annealing process consists in burying the metal in a tank filled with sand, under which a fire is built and banked, and the whole allowed to cool. When the steel is taken out it possesses increased ductility.

In addition to the construction of these guns, much work has been and is being done at the yard in the way of making machinery

another a depression in the head of rail forms over or near the additional support. Of this depression the length, depth and exact location as regards the support are determined by the uniformity of material in the rail as well as by the ballast used and the facility for draining the road-bed.

2. That wherever the rail receives more support laterally at one point than at another the wear on the rail near this point is greatest and the rail is deflected outwardly on both sides of the support.

3. A low spot on one rail causes the formation of a low spot on the opposite rail just in advance of the original low spot (double track).

4. Where the wheel encounters a low spot on one rail it tends to move the track in the direction of that spot laterally.

5. The outer rails of the outer track wear faster in cuts than on banks.

Theoretically, these laws are objectionable. As illustrating the first law practically, trial with a straight-edge or with a micrometer screw, if preferred, will show that a depression in the head of the rail exists over many cross-ties, but very seldom between them. Occasionally we find the head of the rail lower between ties than over them, but in such cases the straight-edge applied to the upper surface of the rail flange will show that the rail is bent between ties, and not compressed. It will also be found that a depression exists over or near nearly every guard-rail chair, partly due to the support afforded by the tie, and partly to that of the guard-rail chair, but it is found to be greater where the chair is used than where it is not. As illustrating the second law, it is quite well

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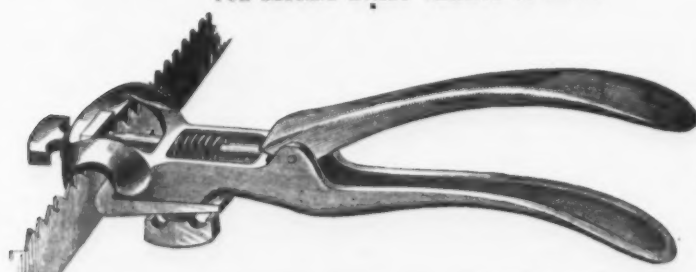
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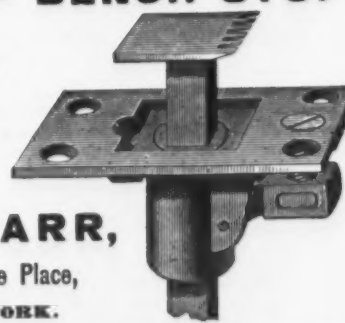
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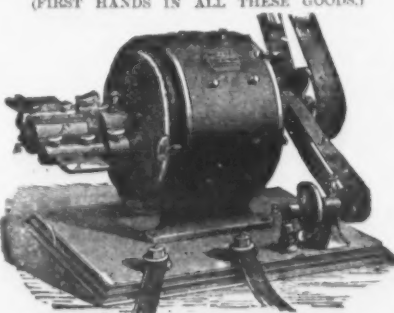
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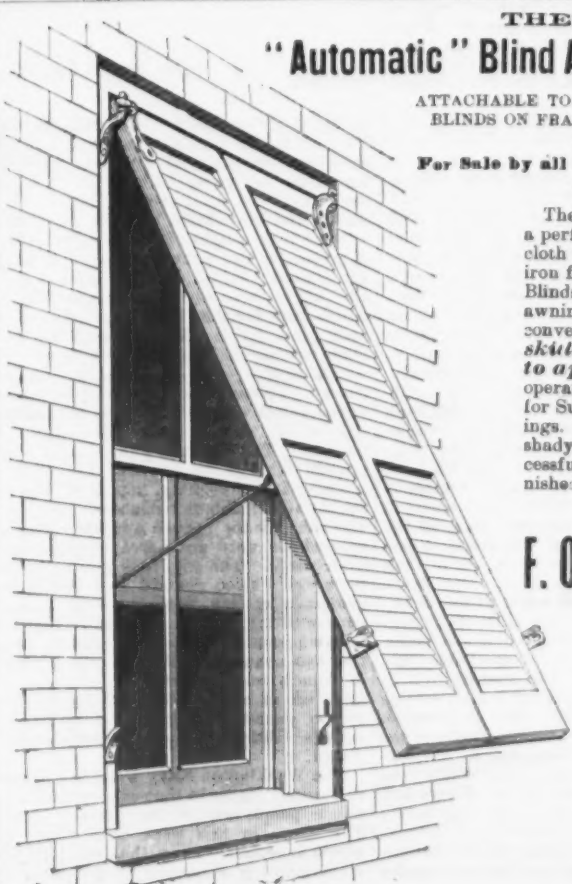
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same position relative to the steam ports, notwithstanding the oscillations of the cylinder, the fixed point *d* on the valve-rod describing the arc *e e'*. If, however, the lower pin be moved to one side and held there, as, for example, to *a* or *b*, the point *d* will describe the arc *f g* or *g f'*, as the case may be, and the engine will run in the direction in which the lower pin has been moved. Reversing may consequently be effected by turning the small hand-wheel at the lower end of the cylinder, shown in Figs. 1, 2 and 3. By means of a segmental rack-

capacity of the new steel plant will be 40 tons per day greater than the present capacity of the nail works, but it is the purpose of the company to increase the nail-cutting department. This will require a total of 231 nail machines, being 78 more machines than are now in operation. The Western Nail Company have already achieved a high reputation for their wonderfully large production of nails. In the year ended June 1 they made 342,434 kegs.

It has been very widely reported that Chess, Cook & Co., of Pittsburgh, have

are earnestly considering the advisability of adding steel plants to their iron works. In some cases the only matter to be settled is the process to be adopted.

In the East a number of owners of iron works will add steel plants of various kinds during the year. The Cedar Point Iron and Steel Company, of Port Henry, N. Y., has contracted for the erection of a Clapp-Griffiths plant to be operated in connection with their blast furnace, being first in this country to take this new departure. The Pottstown Iron Company are erecting a build-

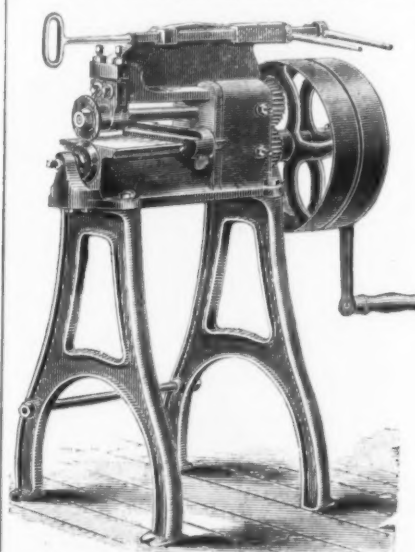
this section at a lower rate than that at which steel can be converted, owing to the lower wages paid to rolling-mill employees in the East as compared with those paid in the West, where steel is produced more cheaply than iron in certain lines of products. Hence the tendency to add steel plants to Eastern iron works is thus far not specially remarkable.—*Bulletin*.

Iron vs. Steel for Locomotive Fire-Boxes.—The *National Car Builder* for June contains the following extract regarding the

parts of the machinery. Lately Mr. Bushnell, master mechanic of the Burlington, Cedar Rapids and Northern Railway, has experimented with iron side sheets for fire-boxes, trying to find out their relative strength and durability, when subjected to the deteriorating influence of bad water, compared with steel. In the fire-boxes of several engines he put in one side sheet of Tennessee iron and one side sheet of Otis steel. The engines so fitted up have done considerable hard service, and the iron has stood so well that the intention now is to put in a whole fire-box of that material. With the steel fire-boxes so far there has been much trouble experienced with cracking from the stay-bolts. The cracks have seldom extended far, but they soon become so numerous that the leakage would be serious.

Rotary Slitting Shears.

The accompanying engraving represents a new form of power rotary slitting shears recently brought out by the Niagara Stamping and Tool Company, Buffalo, N. Y. This company are making several sizes of the shears shown which are adapted for different purposes. They recommend them for slitting sheet iron, brass, copper, tin plate and galvanized iron up to No. 12 gauge. While these machines are primarily calculated to run by power, in addition to pulleys, they are provided with a crank, so that they can be turned by hand. It is asserted that No. 12 iron is readily cut in this manner. Reels for winding and unwinding rolled brass are supplied as an attachment when required. This style of shears is recommended by the makers for use in cornice shops where the cost of an 8-foot squaring shears could not be



New Rotary Slitting Shears, Manufactured by the Niagara Stamping and Tool Co., Buffalo, N. Y.

afforded. The machine shown has a depth of throat of 16 inches, so that it will slit the 30-inch sheets in the center. The general construction of the machine is readily understood by the engraving. Its parts are simple and so arranged as not likely to get out of order.

The Use of Natural Gas.

The following new rules in regard to the use of natural gas in manufacturing establishments have been adopted by the Pittsburgh Local Board of Fire Underwriters:

1. That when gas is to be introduced into any premises a tank governor or regulator shall be placed as remote as possible from the building, by which the pressure shall be reduced to not exceeding 2 pounds.
2. A safety valve shall be placed between the governor or regulator and buildings, which will blow off when the pressure exceeds 2 pounds.
3. A mercury gauge must be placed inside of buildings which will indicate the exact pressure in the pipes.
4. All pipes leading from the regulator and into the mills shall be of as large diameter as possible, and all pipes on entering a building shall be elevated and carried overhead and above all furnaces and boilers.
5. All pipes, valves and fittings shall be carefully inspected, when the work is completed, by the secretary of this board before the privilege is given to use natural gas.

The fire marshal and secretary of the board are required to examine all premises where the use of natural gas is desired, and where the requirements are complied with a certificate is issued to the insured to the effect that the arrangements for the use of gas are in accordance with the regulations of the board. The new rules reduce the maximum pressure of gas 1 pound below that fixed by the first rules which were adopted in August.

A new mode of finishing scissors and shears forms the subject of a patent issued to D. Wheeler, of Bridgeport, Conn. The object of the invention is to save the expense of first grinding, then plating and finally polishing the entire surface of the shears. The inventor cuts parts of the surfaces roughly, preferably the exterior of the bows. These parts are plated as they come from the molds—that is, without grinding or polishing. They then require no buffing or polishing, but represent a frosted appearance, which is said to be less expensive than polished work and to command a higher price in the market.

The blast furnace of Perkins & Co., at Sharpville, is doing remarkable work. During the month of April an average product of nearly 100 tons per day was obtained, the coke consumed per ton of pig produced being 2235 pounds. This is the lowest fuel consumption we have any positive information of. This furnace is 14-foot bosh, 65 feet high, and has but one 72-inch blowing engine.

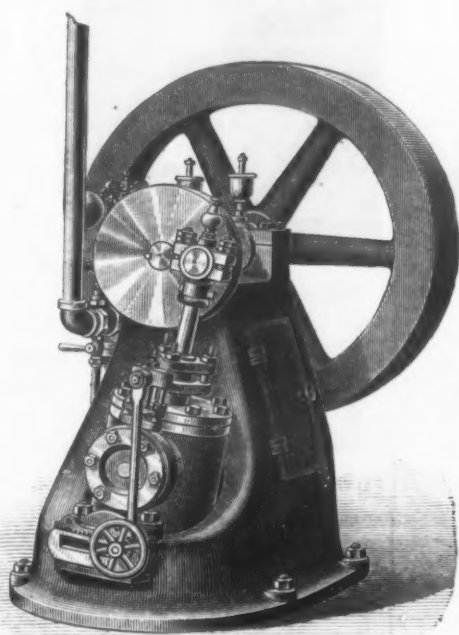


Fig. 2.—Perspective View.

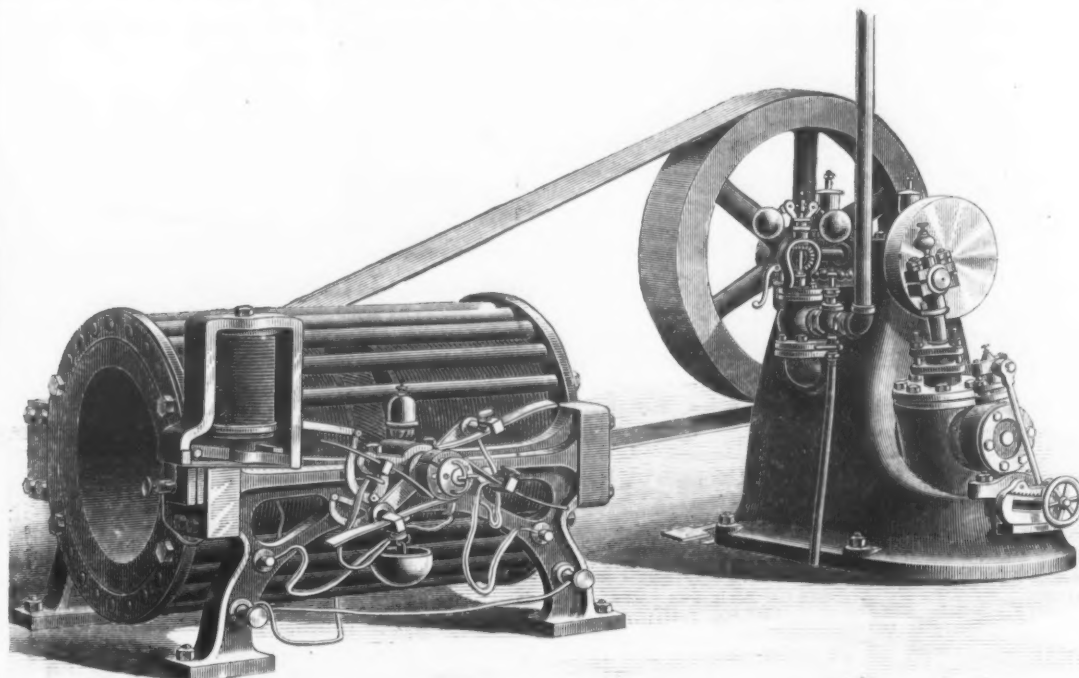


Fig. 3.—Perspective View of Engine Connected with Dynamo.

A NEW OSCILLATING ENGINE, BUILT BY MESSRS. MOORE BROS., PORTSMOUTH, OHIO.

and-pinion arrangement this throws the center of oscillation of the small connecting-rod from one side of the center line of the trunnions to the other at the will of the attendant. This feature of the valve motion is specially applicable to elevator work and all classes of work requiring a frequent change in direction of motion. From Fig. 1 it will be seen that live steam after having passed through the governor-valve is led to the center of the inside trunnion. Here it enters a brass tube concentric with the trunnion, and after passing through this it is carried around the cylinder and into the steam-chest. The exhaust steam passes from the valve port around the opposite side of the cylinder and out through the back trunnion through a channel formed around the live-steam pipe. By leading steam and exhaust through one trunnion in this manner only one stuffing-box is necessary. An unusually large stuffing-box around the piston-rod, together with a well-fitting piston, gives a sufficiently long bearing to insure satisfactory behavior. The lower end of the cylinder is fitted with a relief-valve for water of condensation. This valve is furnished with a spring holding it against its seat, and is worked by a treadle arranged in the manner shown. Taken altogether, the engine embraces a number of valuable features which will no doubt be duly appreciated.

New Steel Works in the United States.

Contracts have been made for the erection of a Bessemer steel plant at Mingo Junction, Ohio. It will be operated by the Junction Iron Company and the Laughlin Nail Company, Samuel Laughlin being president of the former company, and his brother Alexander of the latter. The plant is to be completed in September next. Its location will be near the blast furnaces of the Junction Iron Company, which will make the Bessemer pig iron needed. A part of the equipment, embracing two 5-ton converters, three 8-foot cupolas, a 34-inch reversible blooming mill with hydraulic tables and lifting apparatus, a pair of 28 x 58 reversing engines, and blowing engines with 34-inch steam and 48-inch air cylinders and 5-foot stroke, will be built by McIntosh, Hemphill & Co., of Pittsburgh, with C. Amaler, M. E., late of the Riverside Iron Works, in charge of the construction and supervision. Eight Holley cranes will be built by Morgan, Williams & Co., of Alliance, Ohio. Twelve boilers and an iron building 80 x 150 feet, for converting department, engine and ganister houses, &c., will be supplied by Riter, Conley & Co., of Pittsburgh. Four duplex pressure pumps will be from Epping, Carpenter & Co. The hydraulic apparatus, pipes, valves, &c., will be furnished by Atwood & McCaffrey. The daily capacity will be 300 tons of nail slabs. The two companies, whose offices are at Wheeling, W. Va., though their works are in Ohio, are extensive manufacturers of nails, and they expect their joint product of steel nails to be 2500 kegs daily when their arrangements are completed. The erection of the new steel plant will involve an expenditure of \$260,000.

The Western Nail Company, of which Gen. W. H. Powell is president, have contracted with James P. Witherow, of Pittsburgh, for the erection of a Clapp-Griffiths steel plant at Belleville, Ill. The building will be constructed entirely of iron, and its dimensions will be 90 x 120 feet, divided into two compartments. In one compartment will be contained a hydraulic metal hoist, two cupolas with provision for an additional one when required, two 3-ton converters, two 10-inch hydraulic rams to elevate bottoms, and the necessary hydraulic cranes for handling ladles, ingots, &c. In the other compartment will be the boilers, blowing engines, cupola blowers, pumps and accumulators, repairing-room, &c. The cost of this steel plant, fully equipped for producing 125 tons of steel ingots per day of 24 hours, is estimated at \$75,000. The ca-

arranged for the erection of steel works at a site which they have purchased near the Edgar Thomson Steel Works, at Braddock. We are informed however, that it is not their intention to erect a steel plant at pres-

ing at Pottstown, Pa., to contain their steel plant, the character of which has not yet been made public. The Danville Nail Mfg. Co., also of this State, have appointed a committee of their directors to investigate the several steel-

decision of Mr. R. W. Bushnell, the master car builder and master of machinery of the Burlington, Cedar Rapids and Northern Railway Company: "During the present year the Burlington, Cedar Rapids and Northern Rail-

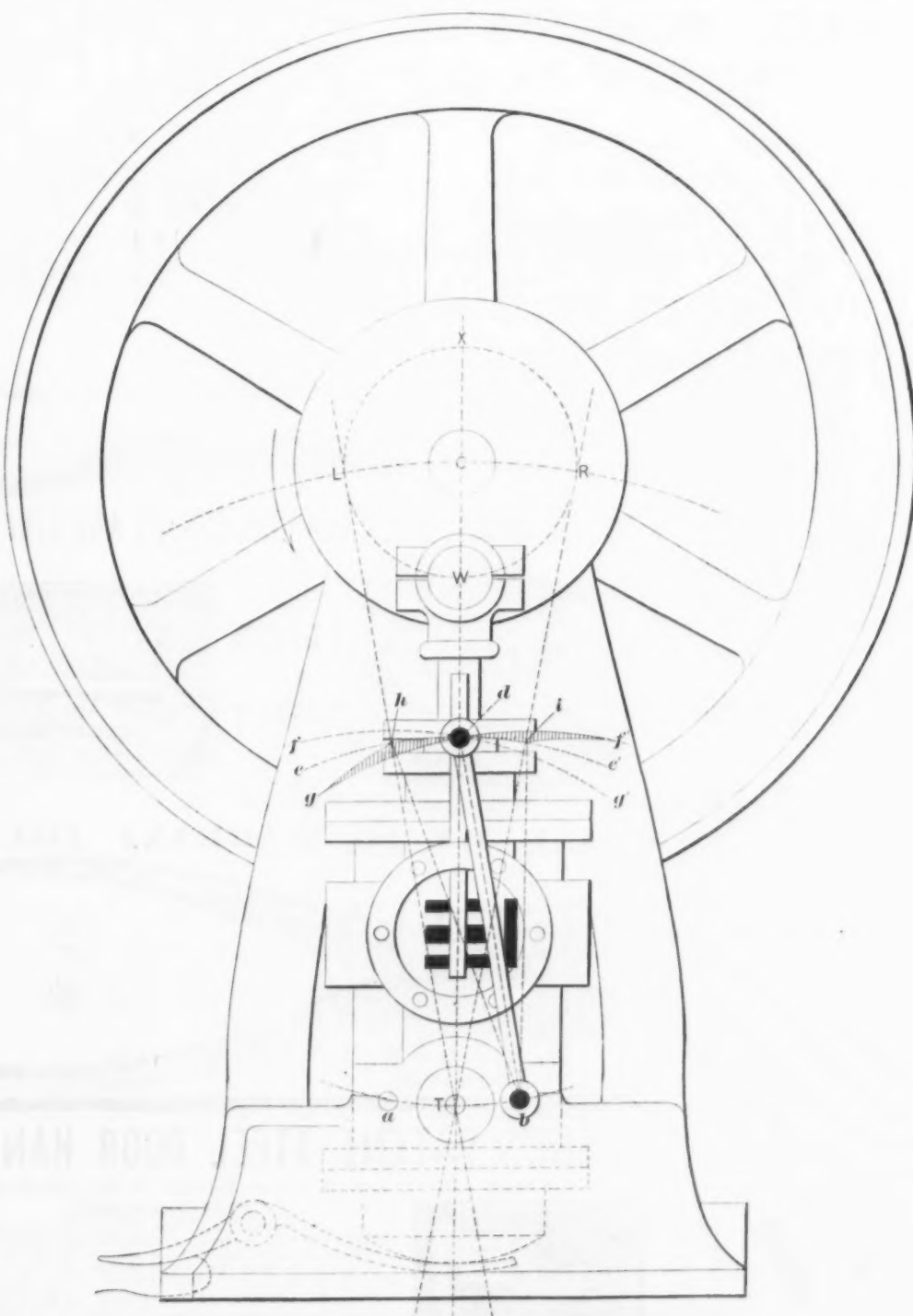


Fig. 4.—Elevation, Showing Arrangement of Valve Gear.

ent. They will build a mill for rolling steel plates for nails, but they propose to buy the necessary steel slabs until next season, when they may decide to erect converters.

Messrs. Snoenberger & Co., owners of the Juniata Iron and Steel Works, at Pittsburgh, are erecting a Bessemer steel plant, of which we are promised a complete description when the work of erection has made greater progress. Other iron manufacturers at Pittsburgh, Wheeling, and points further West

making processes with a view to the adoption of the most suitable one for their purpose. Other Eastern parties are making inquiries concerning the cost of building steel works, but have not yet decided to enter upon the work of erection.

The steel question in the East is on a different footing from that in the West. Here it appears to be a question of quality of product rather than of cheapening the cost of manufacture. Iron can still be worked in

way shops, at Cedar Rapids, Iowa, have turned out 17 locomotives that have undergone extensive repairs. Of these, two have had new fire-boxes and 11 of them new side sheets. People using the soft water common in the Eastern States have no conception of the great increase in the expense of locomotive repairs caused in the Western States by bad water. On some roads the expense of maintaining boilers and fire-boxes is greater than the expense of maintaining all other

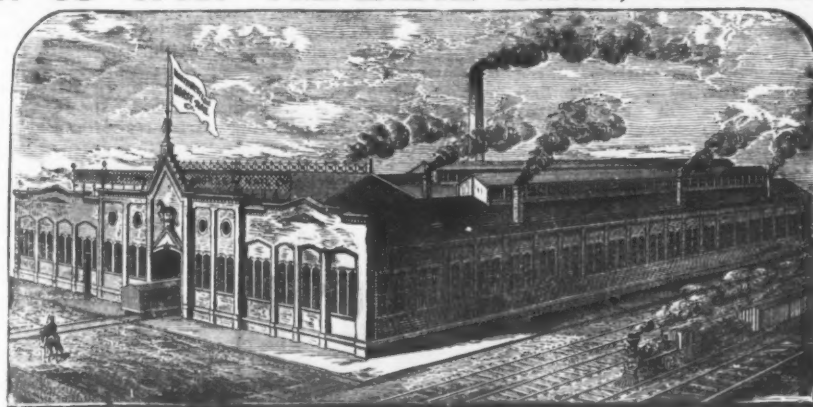
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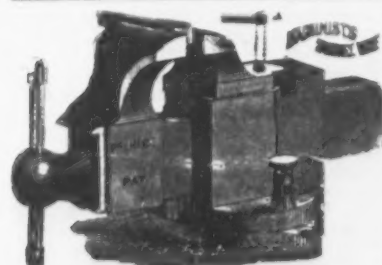


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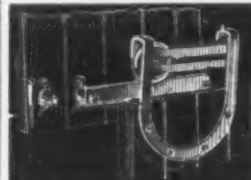
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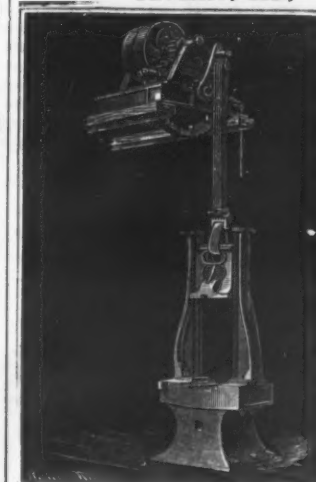
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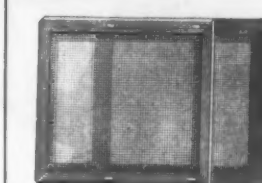
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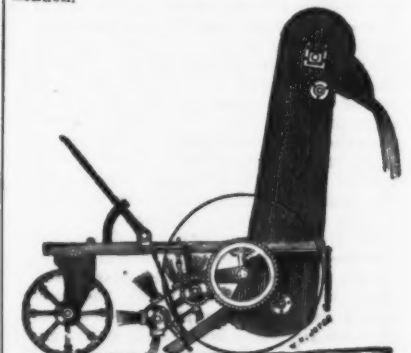
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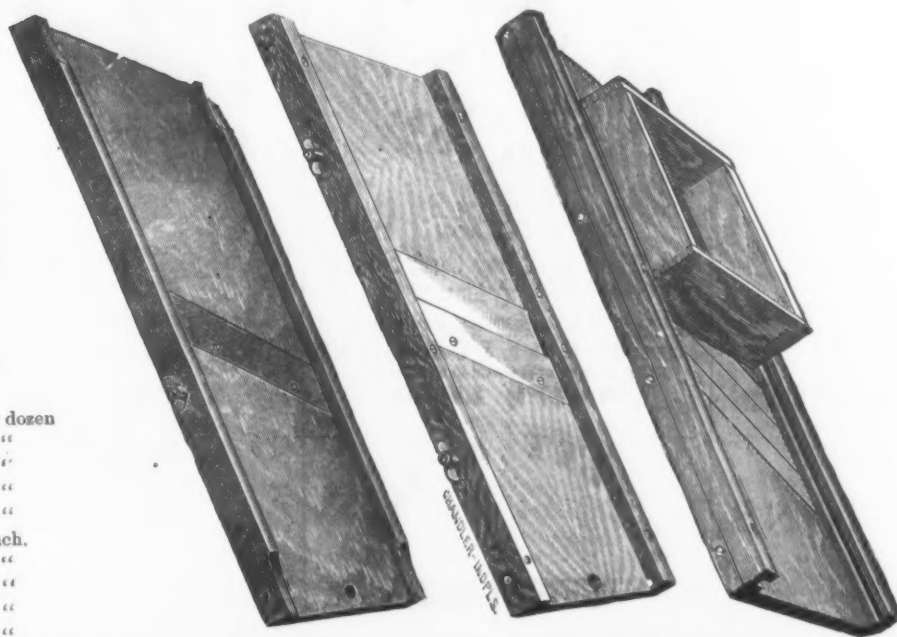
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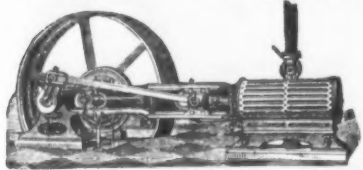
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Yours truly,
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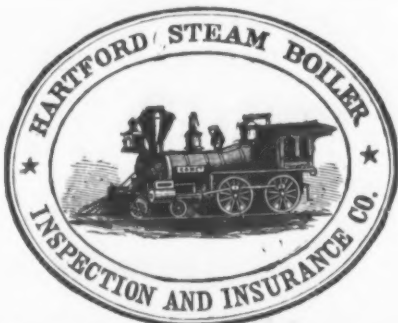


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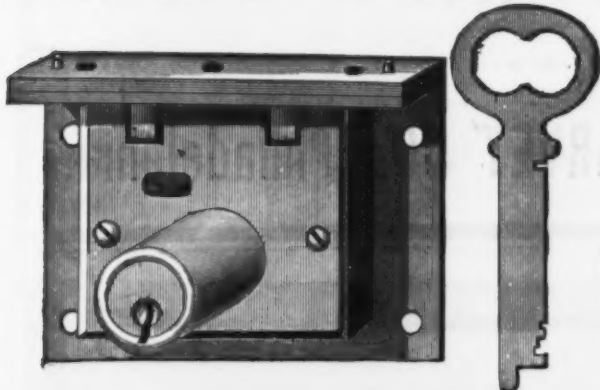
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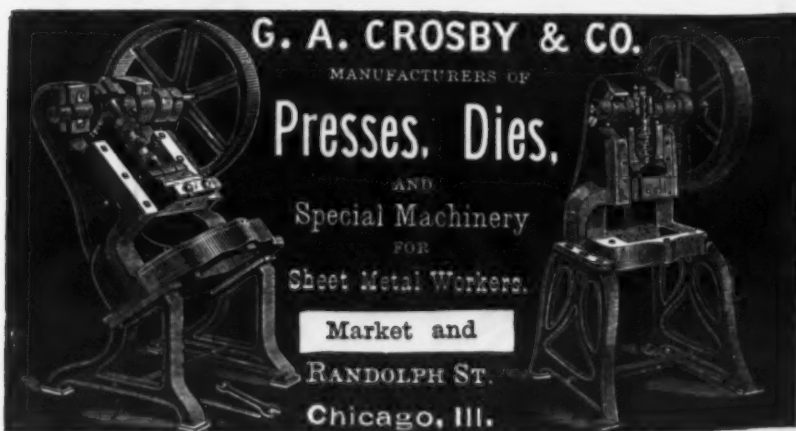
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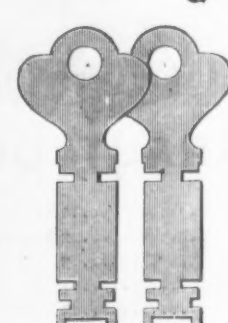
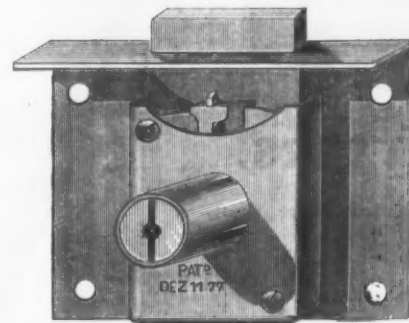
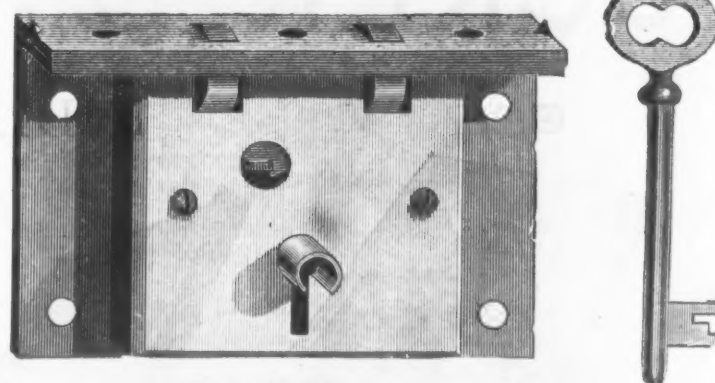
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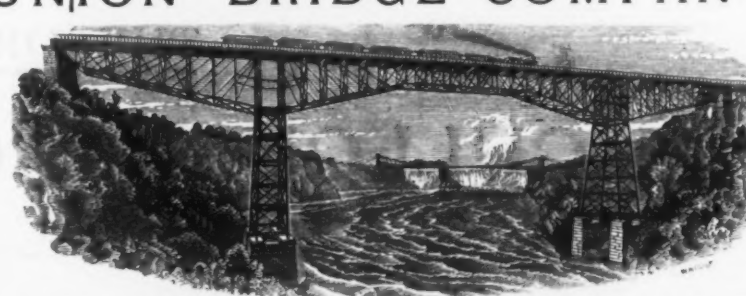
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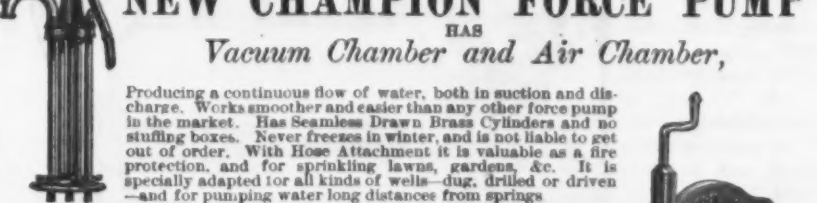
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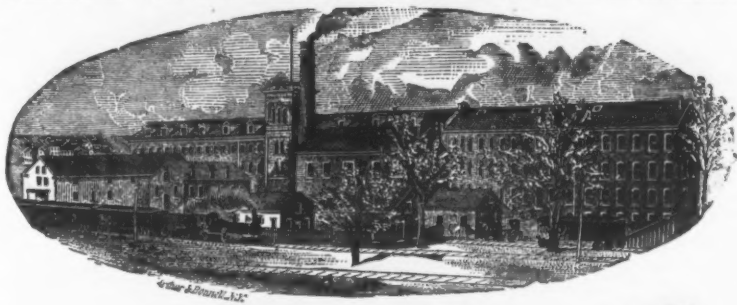
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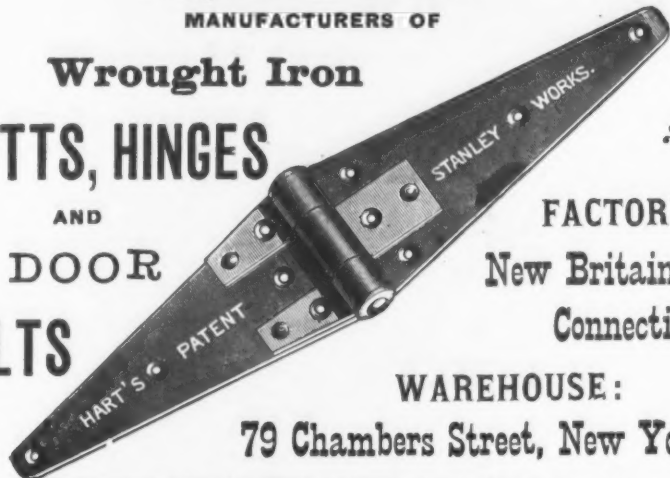


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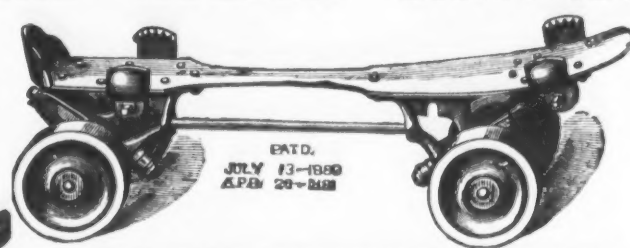
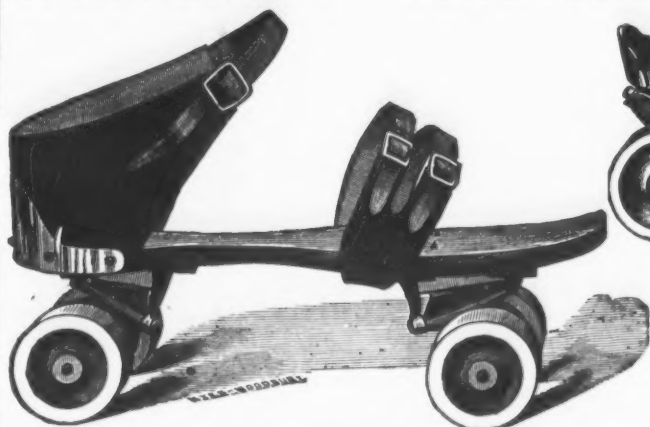
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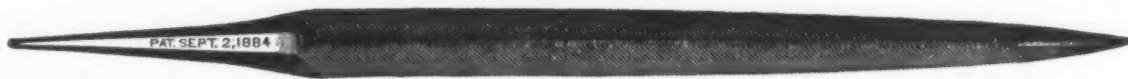


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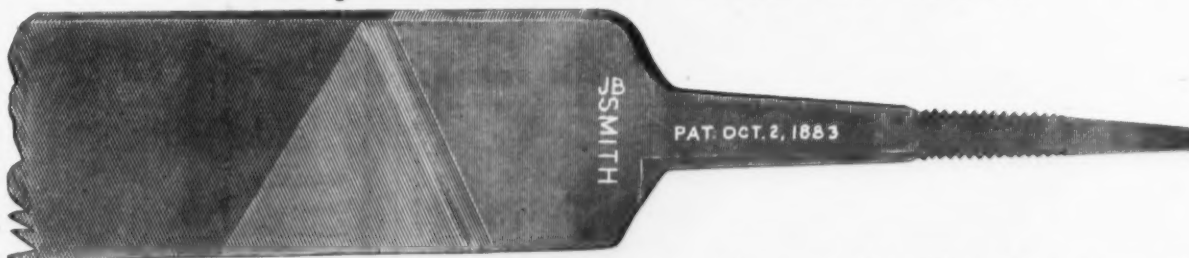
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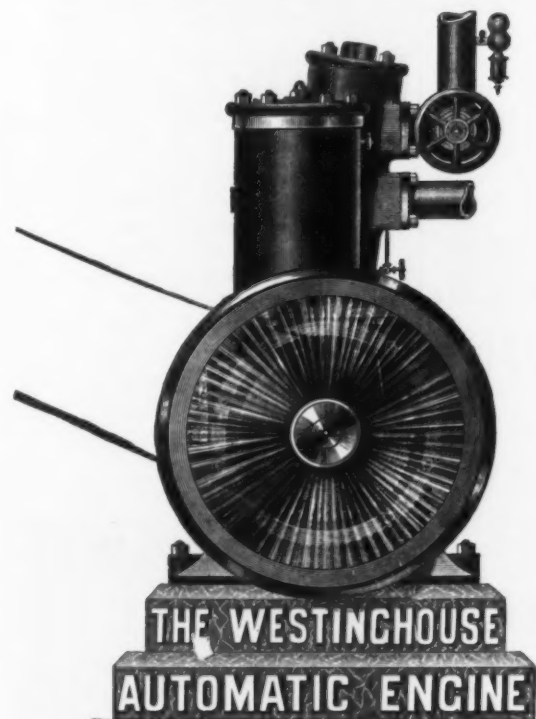
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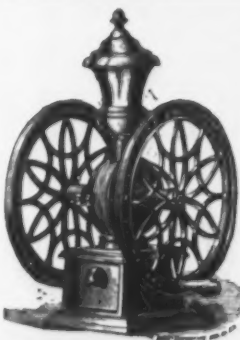
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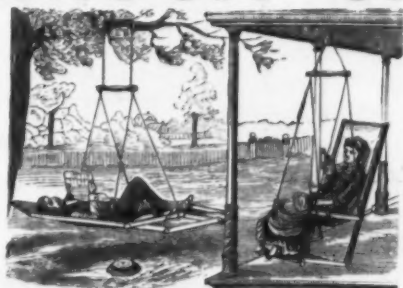
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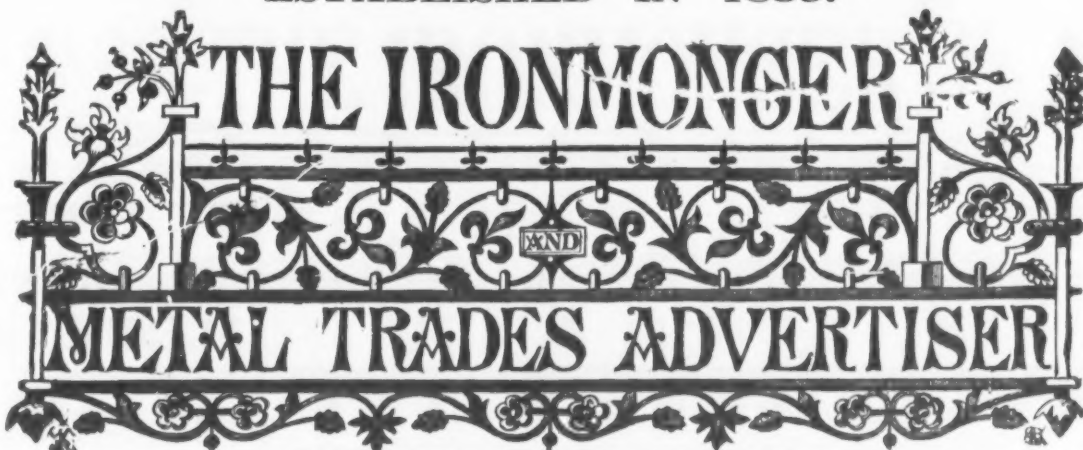
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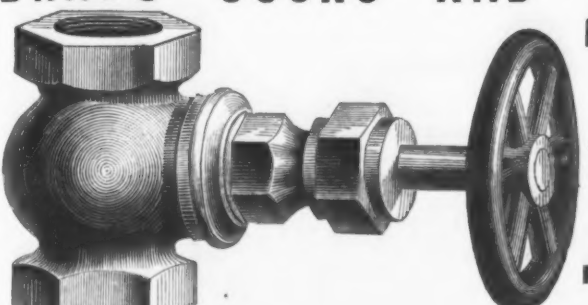
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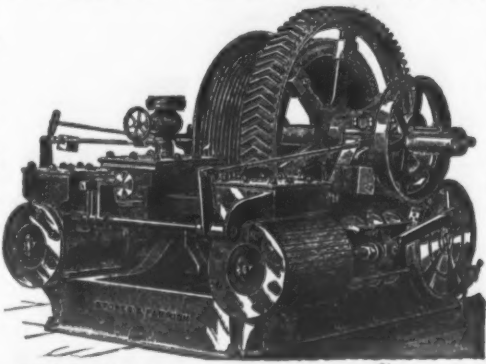


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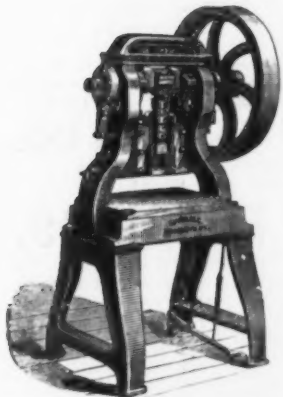
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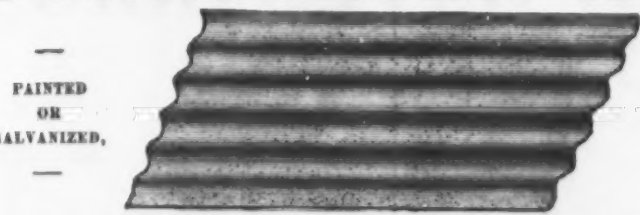
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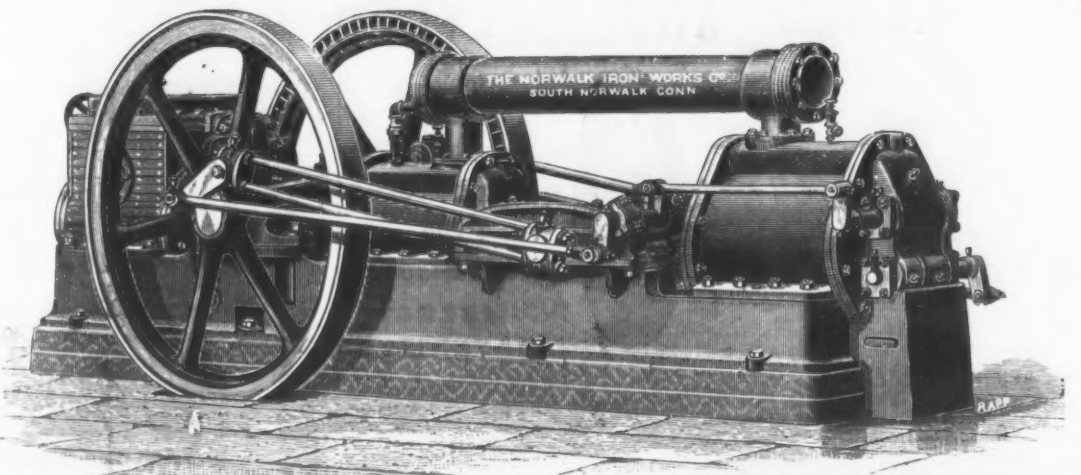
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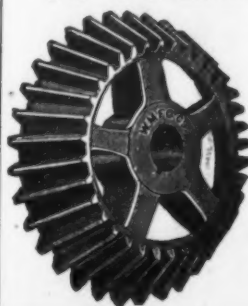
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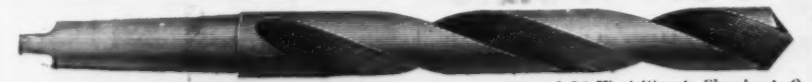
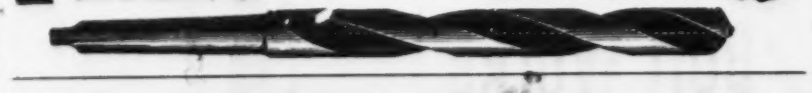
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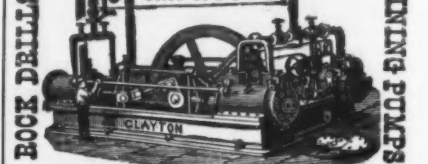
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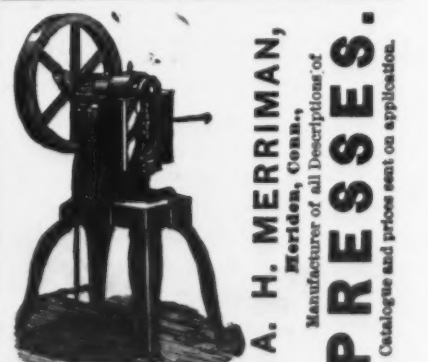
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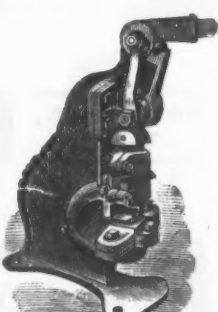
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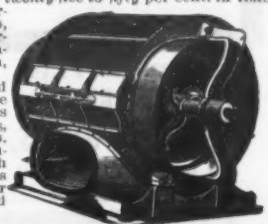
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We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacities in tons per hour—No. 1, one ton; No. 2, two tons; No. 3, three tons per hour, and so on up to 20 or 30 tons. We have improved the construction of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own and the experience of our customers could suggest.



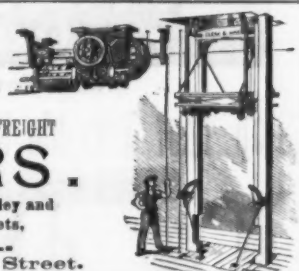
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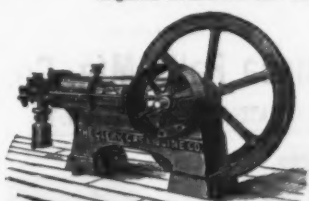
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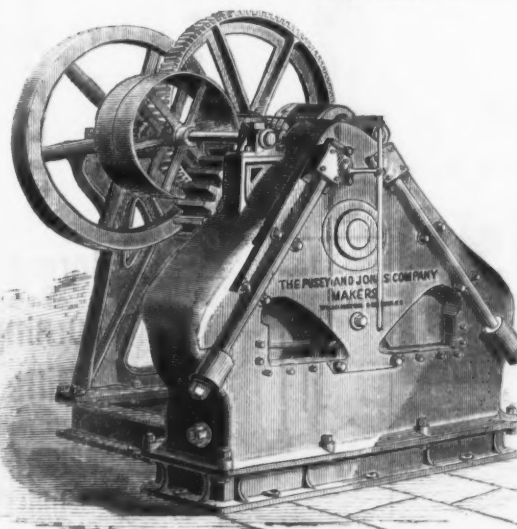
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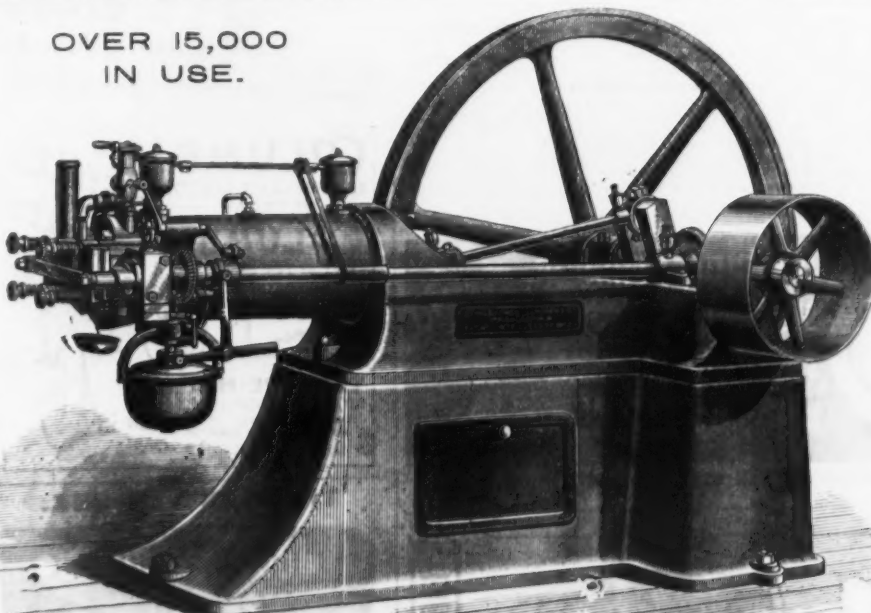
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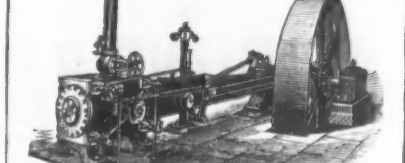
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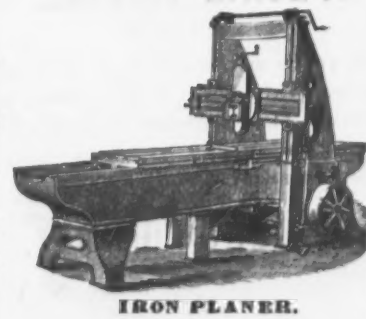
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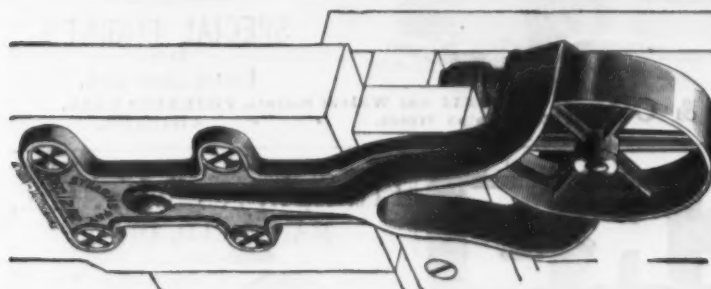
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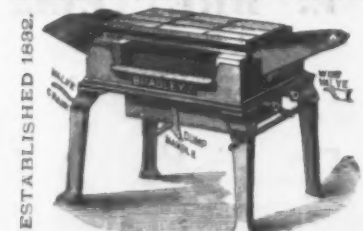
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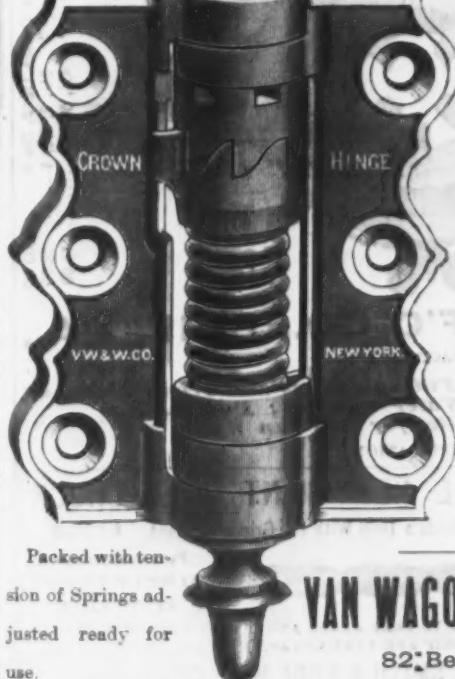
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